COLUC

Central Ontario Lakeshore Urban Complex

population and employment allocations 1971,1986 and 2001

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april 1974

MURRAY V. JONES AND ASSOCIATES LIMITED

PEAT MARWICK AND PARTNERS

April 29th, 1974

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Mr. C. Peter Honey
Assistant Deputy Minister
Urban and Regional Affairs
Ministry of Treasury, Economics
and Intergovernmental Affairs
Frost Building North, 6th Floor
Queen's Park
Toronto, Ontario

Re: COLUC Task Force - Population
and Employment Allocations

Dear Mr. Honey:

It is our pleasure to submit to you our report on the above subject, which completesthe work we were commissioned to undertake by your letter of April 10, 1974.

In addition to the population and employment allocations for 1971, 1986 and 2001, our report comments on the data base available to us, discusses what appear to be some unresolved aspects of the Mature-State Plan and concludes with suggestions for further research work related to these and other problems.

In perusing our report, you will find that we had to apply a considerable amount of professional judgment in reconciling the objectives of the project which calls for a combination of the following criteria:

- adherence to COLUC objectives and phasing logic,
- recognition of trends, and
- recognition of physical constraints.

Using the available data and carrying out some necessary adjustments, we developed population and employment figures as of 1971 and carried out population and employment allocations for 1986 and 2001 within the framework of the above-mentioned criteria. We considered the Mature-State figures and hierarchical relationships as immutable targets and

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used the control totals prepared by the COLUC task force working group as our guidelines in approaching these figures. For the year 2001, we were able to rely substantially on the Mature-State assignments. For 1986,

- the present status and trends,
- the feasible installation and use of infrastructure,
- the objective of achieving the desired decentralization of employment, and
- the distribution of functional roles

had to be considered simultaneously. Our allocations involve significant changes in growth rates in population over a remarkably short period of time, as shown below.

ANNUAL GROWTH RATES OF POPULATION
BY SUB-REGION - PER CENT

	1961/1971	1971/1986	1986/2001	2001/Mature State
COLUC Urban Total	3.0	1.9	1.6	1.2
Metro Toronto	2.3	1.1	0.7	2.4
Aurora/Newmarket Sub-region	4.3	3.7	3.0	2.4
Mississauga Sub-region	7.5	4.8	3.2	1.8
Hamilton Sub-region	3.3	2.0	1.5	1.2
Oshawa Sub-region	3.9	4.2	4.4	3.4

Knowing the present infrastructure, preferences and short term government plans, it seems to us very unlikely that a substantially more rapid deceleration of Metro Toronto and the Mississauga sub-region could be realistically accepted for 1986. The Oshawa sub-region, which grew 1.3 times faster than the COLUC urban area from 1961 to 1971, is assumed to grow 2.2 times faster from 1971 to 1986.

The change in activity rates is also assumed to be dramatic, particularly with regard to retail, service and other (RSO) employment, which will relate to hierarchical status. In the Oshawa sub-region for instance, total employment in 1971 was 62,200, amounting to 37.2% of the population; we predict this to rise to 45.5% in 1986. RSO employment accounted for 51% of the total in 1971, and is to rise to 61% in 1986. Similar changes are expected to take place in the

Mississauga sub-region, with the result in particular that Mississauga itself will change its "dormitory" character into a much more self-sufficient central function. The success of efforts to decentralize employment will mean that the change in activity rates and the share of RSO employment in Metro Toronto will be much less.

We are aware that there is a preference for accelerated growth of the Oshawa sub-region in the immediate future as well as over the long-term to the Mature-State. This preference became a critical issue in the 1986 allocations. We explored this issue in a separate letter addressed to Mr. Schmidt, in an effort to clarify what would in our view be the maximum desirable acceleration of growth in this sub-region to 1986, taking into account the necessity of matching population growth with a corresponding growth of employment and the balance of the COLUC system as a whole, not only to 1986 but also from 1986 to 2001 and the Mature-State. The letter is attached as an appendix to our report.

We hope that our attempt to combine the objectives of the COLUC Mature-State Plan with a meaningful interpolation will serve its purpose of underlining the need for government programs to achieve the radical change in past patterns of growth.

Yours very truly,

P. E. Sandor, for
Peat, Marwick and Partners

H. L. Robinson, for
Murray V. Jones and Associates

TABLE OF CONTENTS

		Page No.
INTRODUCTION		I
PART I	POPULATION AND EMPLOYMENT ALLOCATIONS, 1971, 1986 AND 2001	1
PART II	FUNCTIONAL CLASS AND FUNCTIONAL ROLE	15
PART III	DISCUSSION OF CONTROL TOTALS	19
PART IV	COMMENTS REGARDING THE MATURE-STATE	27
PART V	SUGGESTIONS FOR FURTHER RESEARCH	36

APPENDICES

Appendix 1	Table and Charts - Population and Employment Allocations, 1971, 1986, 2001 and Mature-State
Appendix 2	Ontario: Population Projections by Regions and Counties for Years 1976, 1981, 1986, 1991, 1996, 2001
Appendix 3	Terms of Reference
Appendix 4	Letter to Mr. A.R. Schmidt, April 23, 1974 re Acceleration of Population Growth in Oshawa Sub-Region.

EXHIBITS

		Page No.
Exhibit 1	COLUC Area and Sub-Regions	Facing Page I
Exhibit 2	COLUC Population Estimates and Sub-Regions	Facing Page 4
Exhibit 3	Population Control Totals	4
Exhibit 4	Activity Rates (Employment by Place of Work) by Sub-Region, 1971, 1986, 2001 and the Mature-State	10
Exhibit 5	Percent Retail, Service and Other Employment by Sub-Region in 1971, 1986, 2001 and the Mature-State	12
Exhibit 6	Alternative Projection of Percent of Retail, Service and Other Employment by Sub-Region, in 1971, 1986, 2001 and the Mature-State	14
Exhibit 7	COLUC Population Totals As % of Ontario	20
Exhibit 8	Projected Population, Ontario and COLUC, 1971 to Mature-State	22

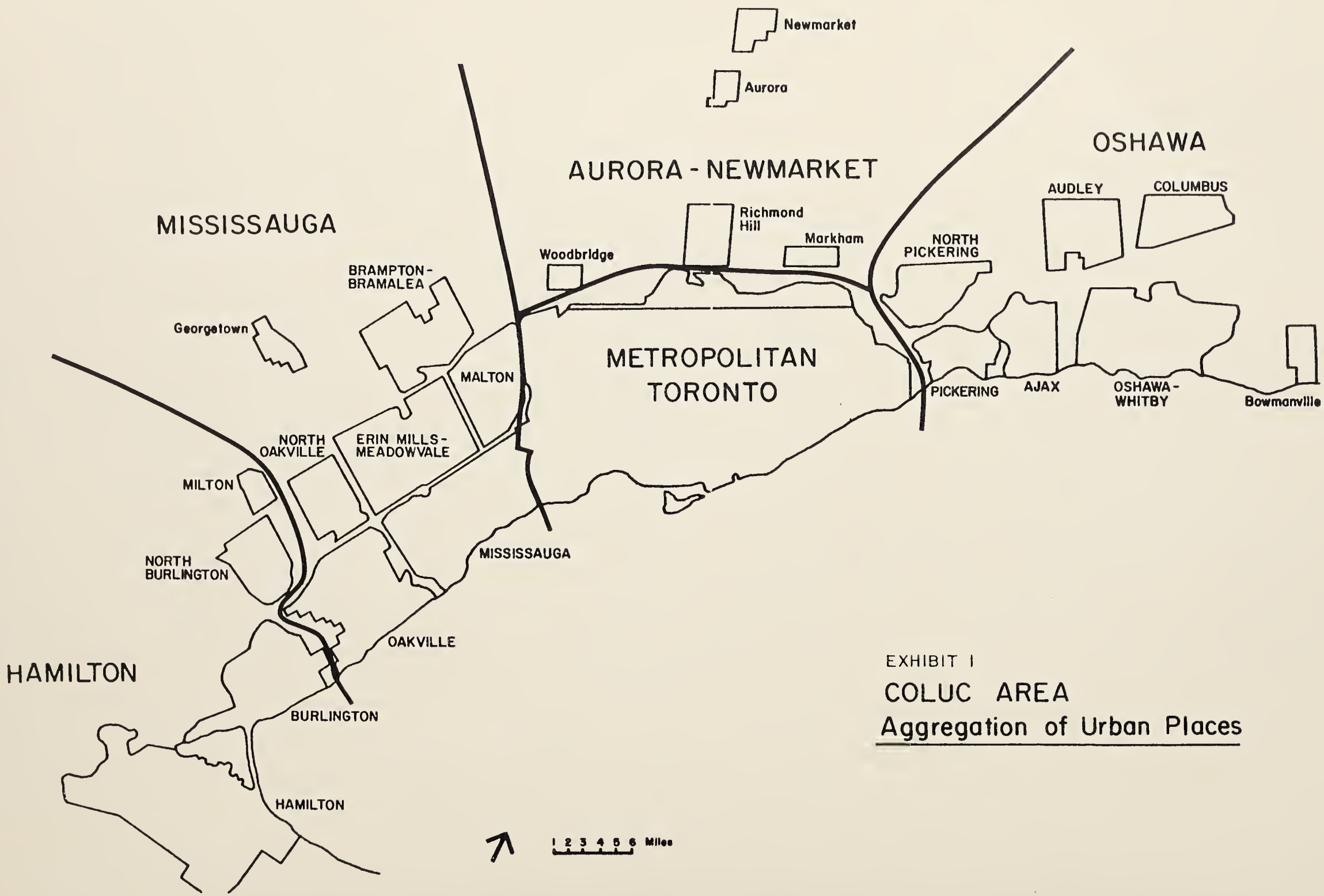

EXHIBIT I

COLUC AREA

Aggregation of Urban Places

INTRODUCTION

The firms of Murray V. Jones and Associates Limited and Peat, Marwick and Partners were charged with the task of establishing population and employment figures for the 23 urban places of the COLUC area in 1986 and 2001. The consultants were requested to use the 1971 census figures as a base and the Mature-State figures as final targets, and to establish meaningful intermediate points for the years 1986 and 2001. The consultants decided that for the purposes of this study, the 23 urban places should when necessary be aggregated into the following five sub-regions:

- Metropolitan Toronto, including the Northern fringe

- Aurora Newmarket
  (Aurora-Newmarket, Richmond Hill, Woodbridge and Markham)

- Mississauga
  (Mississauga, Oakville, Erin Mills, North Oakville, Brampton-Bramalea, Milton and Georgetown)

- Hamilton
  (Hamilton, Burlington, North Burlington and Milton)

- Oshawa
  (Oshawa, Whitby, North Pickering, South Pickering, Ajax, Bowmanville, Audley and Columbus).

A map of these sub-regions is shown in Exhibit 1, opposite.

Employment was consolidated into two categories:

- Manufacturing, construction and wholesaling (M and W)
- retail, service and other (RSO).

Our report is organized into five parts:

Part I	Population and Employment Allocations
Part II	Functional Class and Functional Role
Part III	Discussion of Control Totals
Part IV	Comments Regarding the Mature-State
Part V	Suggestions for Further Research.

PART I

POPULATION AND EMPLOYMENT ALLOCATIONS, 1971, 1986 AND 2001

In accordance with the terms of reference, the Consultants have allocated population and employment for the 23 urban places in the Central Ontario Lakeshore Urban Complex (COLUC) area.

The 1971 population of the 23 urban places was supplied by the working group of the COLUC Task Force on the basis of census data, and 1971 employment allocations were derived by the Consultants from available census and other data. Population and employment allocations for the years 1986 and 2001 were then made on the basis of a desired growth path for each of the 23 urban places from 1971 to the Mature-State, within the framework of the control totals supplied by the COLUC working group. However, given the nearness of 1986, the allocations necessarily had to take into account the existing level of services and irrevocable commitments which have been made. The results of the allocations are given in Appendix 1 as Tables 1 to 5 and are illustrated in the accompanying charts. Table 6 showing employment in the Mature-State is in the same format as Tables 3, 4 and 5.

GENERAL REMARKS

In January 1974, the COLUC Task Force issued a preliminary working document entitled "Definition of the Mature-State Plan". The document represents an elaboration of the work undertaken to develop the Toronto-Centred Region concept and involves a more detailed specification of the preferred structure of the urban system in the COLUC area in its Mature-State.

Planning Objectives

An essential planning objective of the Toronto-Centred Region is to accelerate development in the eastern part of Zone 1 relative to growth in the central and western parts. This objective is expressed in the COLUC Mature-State Plan, which is designed to create a major sub-region centred on Oshawa-Whitby. The Plan also envisages the consolidation of Hamilton as a major sub-regional centre to the west, and also the growth of the City of Mississauga as a major sub-regional centre in order that the large population to the west of Metropolitan Toronto can obtain a number of higher order goods and services there, rather than having to commute to Metro Toronto. The Plan for a more balanced growth of the COLUC area would result in a more efficient use of transportation facilities and in a more decentralized population, providing for a choice of urban centres of widely differing sizes as well as the most cost-effective provision of services.

At the same time, realism must be stressed in the allocation of population and employment, since a number of forces presently exist which will continue to affect the system as it progresses through time. For example, it would be unrealistic to assume greatly accelerated development in the eastern area in the near future, and it will no doubt also be difficult to curb the rate of development in the west. Existing services as well as announced commitments imply continued growth momentum in the western area for the next 10 to 15 years, in addition to which a pattern of preferences has been established which favours development in the west and which cannot readily be shifted

towards the east. Accordingly, the relative shift of growth rates between 1971 and 1986 is less than in the ensuing 15 years to 2001.

In allocating population and employment, we have thus endeavoured to take account of past trends on the one hand and the preferred balance of the Mature-State on the other. We believe that our allocations fulfill the two requirements stated.

Control Totals

As the basis for their work, the Consultants were given control totals for population and employment for the COLUC area for the years 1971, 1986, 2001 and the Mature-State. These control totals have been used with the following modifications:

(1) The TARMS employment figures for 1971 have been substantially revised in light of census labour force and employment data.

(2) We have not used the control figures of the COLUC area's total employment, which include employment in the rural areas, since these were not necessary for our purpose. Instead, the control totals of employment in the 23 urban centres have been used.

(3) Total employment in the 23 urban centres in the Mature-State has been taken as 3,314,000. This figure corresponds with the total of Column (24), Table 3 of the Mature-State document, plus the 200,000 employees held in reserve.

(4) These 200,000 employees were then allocated to some of the 23 urban centres as explained below.

EXHIBIT 2

COLUC POPULATION ESTIMATES
ONTARIO, COLUC URBAN AND
URBAN SUB-REGIONS
(in 000's)

	1961	1971	1986	2001	Mature State	Mature State/ 1971
Ontario						
Total Pop.	6,236	7,703	9,753	11,646	14,600	
Growth		1.235	1.266	1.194	1.254	
Annual Rate		2.1%	1.6%	1.2%	1.14%	
COLUC Urban						
Total Pop.	2,310.7	3,092	4,129	5,260	6,700	
Growth		1.338	1.335	1.274	1.274	2.17
Annual Rate		3.0%	1.9%	1.6%	1.2%	
Metro Toronto						
Total Pop.	1,681	2,104	2,480	2,740	2,900	
Growth		1,252	1.18	1.10	1.06	1.38
Annual Rate		2.3%	1.1%	0.7%	0.3%	
Aurora/Newmarket Sub Region						
Total Pop.	45.2	69.0	119	185	300	
Growth		1.527	1.72	1.55	1.62	4.35
Annual Rate		4.3%	3.7%	3.0%	2.4%	
Mississauga Sub Region						
Total Pop.	149.9	310	625	1,000	1,415	
Growth		2,069	2.02	1.60	1.42	4.56
Annual Rate		7.5%	4.8%	3.2%	1.8%	
Hamilton Sub-Region						
Total Pop.	320.3	442	595	745	945	
Growth		1.379	1.35	1.25	1.27	2.14
Annual Rate		3.3%	2.0%	1.5%	1.2%	
Oshawa Sub Region						
Total Pop.	114.3	167	310	590	1,140	
Growth		1.464	1.85	1.90	1.93	6.81
Annual Rate		3.9%	4.2%	4.4%	3.4%	

(5) In addition, a population of 5,000 has been added in the Mature-State to each of three urban centres, namely, Brampton-Bramalea, North Burlington and Bowmanville, in order that the total urban population in the Mature-State would agree with the control figure of 6,700,000.

With the exception of these alterations, which are discussed more fully in Part III of this report, the control totals provided by the COLUC working group were used throughout this exercise. They are summarized as follows:

Exhibit 3: Population Control Totals

	1971	1986	2001	Mature-State
		(in 000's)		
COLUC - Total Population	3,325	4,429	5,647	7,229
- Urban Population	3,092	4,129	5,260	6,700
COLUC - Total Urban Employment by Place of Work	1,368	2,035	2,558	3,314
- Urban Activity Rate	44.2%	49.3%	48.6%	49.5%

POPULATION ALLOCATIONS

The first step in the population allocations was to examine the growth trends for Metropolitan Toronto and the four sub-regions defined in the Mature-State document, from 1961 to 1971 as well as from 1971 to the Mature-State. This analysis produced the results shown in Exhibit 2, opposite.

Given the decline in the rate of population growth in 1986-2001 compared with 1971-86, we concluded that the total COLUC urban population of 6,700,000 would be reached in about 2021; population growth after 2001 would be less than in the preceding 15 years. Thus, we think

it is unlikely that the Mature-State would be reached in the linear manner illustrated in Forecast "A" of Figure 1 in the Mature-State document. Since as the Mature-State is approached, new development will occur more and more outside the COLUC area, one would anticipate that the ultimate urban population of 6,700,000 would tend to be reached somewhat asymptotically; that is, the growth of population would tend to level off. Indeed, from this point of view, even 2021 is a rather early date for the Mature-State, and a later date would be preferable, a point to which we return below.

A second point which emerges from Exhibit 2 is the change in the relative growth rates in the east as against the other sub-regions in 1971-86 compared with 1961-71. According to our allocations, growth in the east will be somewhat higher in 1971-86 than before, whereas growth in Metro Toronto and the other three sub-regions, as well as in COLUC as a whole, will be less in 1971-86 than before. This difference becomes even more marked in the two time-spans from 1986 to the Mature-State. This would be consistent with the firm establishment of Oshawa-Whitby's functional role as the major centre in the eastern part of the COLUC area.

Urban Places

Within the framework of the sub-regional totals shown in Exhibit 2, population allocations were then made to each of the 23 urban centres. Particularly in the period 1971-86, these allocations were constrained by the Consultants' knowledge of various servicing capabilities and constraints in particular areas. For example, work by one of the consulting firms indicates that in the Regional Municipality of York, provision of services to Richmond Hill will be easier than to Aurora-Newmarket, where the additional servicing facilities required present both physical and cost problems. For this reason, growth in Richmond Hill is initially higher than in Aurora-Newmarket. Similar factors were taken into account in other allocations, in Mississauga, for example, based on the Consultants' knowledge of these sub-regions.

New Towns

A major question involves the timing of development of the various New Towns to the north of the Parkway Belt. As the detailed allocations show, in the eastern area, we assume that development of North Pickering will already be well underway by 1986 and that rapid development of Columbus will be undertaken before 2001. On the other hand, the development of Audley will be just beginning by that date; rapid development will follow after 2001.

In the Hamilton sub-region, we assume that the development of North Burlington will be delayed until after 2001. In the Mississauga sub-region, the present rate of development of Erin Mills is assumed to continue, while the development of North Oakville will start only after 1986. Brampton-Bramalea is already a major centre north of the Parkway, and thus does not qualify as a New Town in the sense used here. In any case, although large in absolute numbers, its population will grow at a substantially slower rate than that of the New Towns properly speaking.

The relatively greater emphasis on New Town development in the eastern area is of course related to the accelerated growth called for by the Mature-State preferences, including Oshawa-Whitby's role as a major sub-regional centre before 2001, if possible. The servicing and transportation implications of the development of the New Towns as envisaged in our population allocations are important. The New Towns are an essential element of the Mature-State plan. Equally, the timing of development of these New Towns is an essential element in achieving the relative growth rates required for the COLUC sub-regions; clearly, the Mature-State can only be realized if these relative growth rates are changed.

EMPLOYMENT ALLOCATIONS

Labour force and employment data for 1971 provided the starting point of the employment allocations. These data were from two sources: the TARMS data base and the 1971 census. The TARMS data were collected by summer students working for the Ministry of Transport and Communications in 1972. The reliability of the data is open to some doubt, given the limited time which the students were given for their work. The 1971 census provided the following:

(i) employment by place of residence in the six counties plus the Municipality of Metropolitan Toronto which comprise the COLUC area. From this we were able to calculate that the total employment of persons residing in the COLUC area, omitting the appropriate parts of Ontario and Durham Counties, was 1,458,000 in 1971. In the 23 urban places, the corresponding figure was 1,357,000, representing an activity rate of 43.9% of the total COLUC urban population of 3,092,400. Activity rates in the separate counties as well as the Metropolitan areas of Toronto and Hamilton were not uniform; they varied between a low of 37.9% in Durham County and a high of 45.7% in the Municipality of Metro Toronto;

(ii) the experienced labour force by industrial classification for the six counties and Metropolitan Toronto, including a special breakdown of trade into wholesale and retail. We were thus able to ascertain that 38.3% of total employment was in manufacturing, construction and wholesaling, constituting the first of the two categories condensed from the TARMS five-fold classification, while 61.7% of employment was in the second category, made up of retail, service and other employment. This percentage split differs substantially from the split shown by the TARMS data, which was 44.3% - 55.7%.

Figures for 1971 and the Mature-State

The 1971 control total of 1,368,000 for employment by place of work in the 23 urban places, provided by the Task Force working group, implies a net in-commuting of 11,000 into the 23 urban places. Although this is probably less in-commuting than in fact occurred, we did not wish to alter the control total provided by the working group. This total exceeds by 101,000 the total of 1,267,000 obtained from the TARMS data.* The first task in the employment allocations was therefore to increase the TARMS figures for the 23 urban places so that they would add up to 1,368,000. This was done on a proportional basis, by multiplying each of the TARMS figures by 1.08; the results are shown in Column (1) of Table 2 and Column (1) of Table 3, which are identical. (See Appendix 1 for reference).

The second step was to divide the 1971 employment in each urban place into the two categories required, taking account of the TARMS figure on the one hand, which shows that the split varies considerably from one place to another, and the overall split of 38% - 62% mentioned earlier on the other. The TARMS figures were used as weights to distribute the control totals by urban place and by employment sector. The results are shown in Columns (3) and (4) of Table 3.

The employment allocations for 1971, together with those of the Mature-State, provided the two benchmarks for the employment allocations in 1986 and 2001. However, before using the Mature-State figures as given in Table 3 of the Mature-State document, it was necessary to distribute the 200,000 employees held in reserve. 20,000 of these were allocated to Malton and 70,000 to North Pickering; this latter figure seemed a reasonable maximum in light of the Consultants' knowledge of the prospective volume of traffic at the North Pickering airport and the number of employees which might be required.

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*The difference is probably due to the fact that the TARMS data counted as employed only those who had worked 35 hours during the week of the survey, whereas the census definition of an employed person is broader - see 1971 Census Advance Bulletin 94-790.

The remaining 110,000 employees were allocated to the six following places: Oakville, Erin Mills, Brampton-Bramalea, South Pickering, Oshawa-Whitby and Columbus. The rationale for this allocation was to increase the activity rates in these places so that they would more closely correspond to the rates in other places of the same functional class. For example, Burlington has an activity rate in the Mature-State of 43% and is in functional Class IV, whereas Columbus, which is also in Class IV, is shown in Table 3 of the Mature-State document with an activity rate of 25% and Erin Mills with a rate of 22%. As a result of our allocations, these two places as well as Brampton-Bramalea and South Pickering, all of which are in functional Class IV, will have activity rates of 30% or more. The activity rate of Oshawa-Whitby has been increased from 47% to 54% and Oakville's rate from 36% to 51%. All of the 200,000 employees have been allocated to retail, service and other employment which, with other minor adjustments, now totals 2,320,000 and is equal to 70% of 3,314,000.

With total employment by place of work in the 23 urban centres at 3,314,000, an activity rate of 46% applied to the total urban population would give total employment by place of residence of 3,082,000. This would imply net in-commuting to the 23 urban centres taken together of 232,000; this seems too large. Moreover, although the issue is speculative, we are not convinced that the activity rate in the Mature-State will be lower than at the turn of the century. In order to keep net in-commuting to a smaller total, we decided to use an activity rate of 48% in the Mature-State, resulting in total employment by place of residence of 3,216,000 and a total in-commuting of 98,000. This seems more reasonable, and the figures in Columns (22) and (25) of Table 3 in the Mature-State document have been adjusted accordingly.

By interpolation, net in-commuting was estimated at 41,000 in 1986 and 64,000 in 2001. The net in-commuting totals were distributed to Metropolitan Toronto and the four sub-regions in the first instance, and then as between the urban centres in each sub-region.

Figures for 1986 and 2001

Using the control figure of 2,035,000 for total employment in 1986, total employment by place of residence was obtained by subtracting 41,000, giving a total of 1,994,000 and an activity rate of 48.3% overall. This total was allocated to the sub-regions and individual centres taking account of the variations in the activity rates noted in 1971. Similarly, subtraction of 64,000 from the control total of 2,558,000 for employment by place of work in 2001 gave a total of 2,494,000 for employment by place of residence and an activity rate of 47.4% overall. This rate was likewise applied to the sub-regions and the 23 urban centres, again taking account of the variations noted in 1971 although to a lesser extent. Employment by place of work in 1986 and 2001 was then obtained by adding or subtracting the net commuting for each centre, estimated as per the preceding paragraph.

The resulting activity rates by sub-region are shown below:

Exhibit 4:
Activity Rates (Employment by Place of Work)
by Sub-Region, 1971, 1986, 2001 and the Mature-State

	1971	1986	2001	Mature-State
Metro Toronto	47.7	51.5	50.0	50.0
Aurora-Newmarket	28.3	50.3	42.7	47.0
Mississauga	37.5	44.3	44.3	45.2
Hamilton	37.9	49.1	52.3	56.5
Oshawa	37.2	45.5	46.8	48.2
COLUC - Urban Total	44.2	49.3	48.6	49.5

The activity rates for the 23 urban places taken together are slightly higher than for the COLUC area as a whole, owing to the lower rate in the rural areas and the related in-commuting. In particular, the rate of 49.3% in 1986 compares with the overall COLUC rate of 48.7%; the corresponding figures for 2001 are 48.6% and 48.0%. An examination of the above figures, together with Tables 2 to 5 and the accompanying charts, shows that the high rates for 1986 involve some difficulties for the sub-regional employment allocations and for the urban places within the sub-regions. In particular, there is a sharp rise in the activity rates in the four sub-regions outside Metropolitan Toronto from 1971 to 1986, compared with a much smaller rise (or none at all) in the following 15 years to 2001. If the sub-regional allocations in 1986 were reduced, the consequence would be, within the framework of the given control total, an even greater rise in the activity rate for Metropolitan Toronto, which is already higher in 1986 than in 2001. In our view, it would be desirable to re-evaluate this problem in light of the further work proposed later in this report.

The final step was to split the employment figures thus arrived at into the two employment categories. For this purpose, a sectoral split in 1986 and 2001 was first required.

As noted, the first category of employment (manufacturing, construction and wholesaling) accounted for 38.3% of total employment in 1971, whereas in the Mature-State it was assumed to account for 30%. Interpolation gave 35.7% for 1986 and 33.1% for 2001. Control totals for the two sectors followed directly from the controls for total employment. Using the totals for the five sub-regions, a distribution was made according to a matrix of weights, computed by geometric interpolation between 1971 and the Mature-State. Within the four sub-regions, the method was repeated in order to obtain employment by sector for the 23 urban places. The results are presented in Tables 4 and 5.

Distribution of RSO Employment

A striking feature of the structure and distribution of employment in the Mature-State is the extremely rapid increase in retail service and other employment postulated for the Hamilton, Mississauga and Oshawa-Whitby sub-regions, which at present depend heavily on manufacturing industry, compared with the small relative change in service versus manufacturing and wholesale employment in Metropolitan Toronto and Aurora-Newmarket. This feature is illustrated by the following figures, derived from Tables 4 to 6 of Appendix 1.

Exhibit 5:
Percent Retail, Service and Other Employment
by Sub-Region in 1971, 1986, 2001 and the Mature-State

	1971	1986	2001	Mature-State
Metro Toronto	64.7	66.9	68.0	67.6
Aurora-Newmarket	63.1	65.4	67.1	67.4
Mississauga	51.4	58.4	63.9	71.0
Hamilton	54.5	60.3	65.0	68.9
Oshawa	50.6	60.8	69.0	76.9
COLUC-Urban Total	61.7	64.3	66.9	70.0

The increase in service employment is particularly marked in the Oshawa-Whitby sub-region, where service employment accounted for 51% of the total in 1971 and is assumed to account for 77% in the Mature-State. Part of this is of course due to the North Pickering airport, but even without the airport service employment would still account for 74% of the Mature-State total in the eastern sub-region. In Metropolitan Toronto, on the other hand, retail, service and other employment already accounted for 65% of the total in 1971 and is assumed to account for only 68% in the Mature-State. Considering

that in the COLUC area as a whole, this service employment will increase more rapidly than manufacturing and wholesale employment, and considering also that a primary object of the Mature-State Plan is to decentralize employment as a whole, it may indeed be that the best way to accomplish this object will be to emphasize and accelerate the second rather than the first employment category in the outlying sub-regions, since it is this second category which will in any case increase the most in the area as a whole. Our allocations in 1986 and 2001 indicate that this relative emphasis of service employment in the eastern and western sub-regions must already be in evidence by 1986 if the Mature-State preferences are to be achieved.

On the other hand, one may doubt whether the corollary of this emphasis, namely, the minor change in the composition of employment in Metropolitan Toronto, is realistic. An alternative scenario would be a more rapid increase in retail, service and other employment in Metro Toronto, accompanied by relatively more dispersion of manufacturing and wholesale employment to the other sub-regions. Development would proceed more in accordance with the principle that "birds of a feather flock together", that is, manufacturing employment, other things being equal, is more likely to be attracted to urban places where manufacturing is already relatively important than to places where it is less, and similarly for other activities. A number of studies indicate that this kind of dispersion is already taking place.* Assuming that it will continue, the result would be that the relative change in the balance of the two employment categories would be more nearly equal as between Metro Toronto and the North on the one hand, and the other three sub-regions on the other. This alternative scenario is illustrated

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*see for example, L. Collins, Industrial Migration in Ontario, Statistics Canada, 1972, Catalogue 31-509.

by the following percentage figures, which may be compared with those on the preceding page and which of course substantially modify the Mature-State allocations of employment by category to the 23 urban places.

Exhibit 6:
Alternative Projection of Percent of Retail, Service and Other Employment by Sub-Region, in 1971, 1986, 2001 and the Mature State

	1971	1986	2001	Mature-State
Metro Toronto	54.7	68.4	71.9	75.7
Aurora-Newmarket	63.1	66.9	70.5	74.3
Mississauga	51.4	56.8	59.7	64.2
Hamilton	54.5	58.6	62.6	67.0
Oshawa	50.6	54.8	58.9	63.5
COLUC - Urban Total	61.7	64.3	66.9	70.0

It seems to us that the above is one of the basic questions which arises from a critical examination of the Mature-State Plan.

PART II

FUNCTIONAL CLASS AND FUNCTIONAL ROLE

The COLUC Mature-State Plan is among other things concerned to define a functional class and functional role for each of the 23 urban places. A preferred functional role is assigned to each urban place in terms of one or more of twelve economic activities and these preferences are summarized by means of rating scales in Table 3 of the Mature-State document. Tables 8A, 8B, 8C and 8D reproduce this key table for 1971, 1986, 2001 and the Mature-State. For the reasons which are explained below, however, we were unable to assign a functional role by economic sectors to the 23 urban places, as shown for the Mature-State in Columns (9) through (20) of Table 3.

Functional Class

In order to determine the functional class of the 23 urban places for 1971, 1986 and 2001, it was first necessary to obtain total service area populations. Figure 7 of the Mature-State document, entitled "Preferred Functional Hierarchy of Urban Places", served as a guide as to the manner in which the service area populations were obtained. However, the hierarchical tree in 1971 was of course not the same as in the Mature-State; our understanding of the dominant orientations in 1971 is shown in Table 8A. Nor did it seem realistic to assume major changes by 1986, with the result that Column (2) of Table 8B is similar to that of Table 8A. With respect to 2001, on the other hand, the dominant orientations are shown as similar to those of the Mature-State, although not all of the population of each urban place was included in the service area population of its dominant centre.

As indicated in Table 8A, the dominant orientations in 1971 differ substantially from those in the Mature-State. For example, little or none of the orientations to Aurora-Newmarket in the North Toronto sub-region existed in 1971. Similarly, the orientation of the urban places in the Mississauga sub-region towards Mississauga was scarcely established in 1971, with the result that the dominant orientation of those places is shown as being towards Toronto. The same applies to the urban places in the western part of the Oshawa-Whitby sub-region.

The functional class of the 23 urban places was obtained by relating their service area populations to the scale shown in Figure 5 of the Mature-State document. Examination of Column (2) in the successive tables indicates marked changes in the functional class of the 23 urban places between 1971 and the Mature-State.

Functional Role

In the Mature-State document, the functional role of each of the 23 urban places is indicated with respect to the twelve economic activities shown in Columns (9) through (20) of Table 8D. Unfortunately, the criteria by which the rating scales for these economic activities were assigned to each urban place are not indicated in the Mature-State document, nor does a means exist similar to that of Figure 5 whereby the service area population of each urban place could be translated into an appropriate functional role by type of activity. We therefore attempted to estimate functional role in 1971, 1986 and 2001 by an alternative method.

Professor John Britton of the University of Toronto prepared a working paper for the COLUC Task Force entitled "Research into the Correlations Between the Functional Roles of COLUC Urban Places and Employment". Professor Britton refers in his paper to the work of Maxwell in the 1965 and 1967 issues of the Geographical Bulletin, in which Maxwell discusses the functional structure of Canadian cities. Maxwell derives regression equations in logarithmic form, which relate the minimum required percentage of employment of various types to the population in urban centres. His work, which followed that of Ullman and Dacey, indicates that there is a consistent log-linear relationship between the minimum amounts of employment in cities of various sizes and their population. Using Maxwell's regression equation and the total service area population of each urban place in 1971, 1986 and 2001, we were able to obtain the minimum required percentage of employment in the 23 urban places for the following economic sectors: manufacturing, transportation, wholesale trade, retail trade, business services and government services. We then ranked the urban places according to these minimum percentages, and attempted to classify the results according to the functional role rating scales found in the Mature-State document.

Unfortunately, the rank order of the urban places was the same for all of economic sectors. That is, according to Maxwell's equations, Toronto ranks I in sectors, Hamilton II in all sectors, and so on. The reason for this appears to be that, although the equations have different slopes and intercepts, the minimum required percentages of employment are all an increasing function of population. City size, as measured by population, thus determines the ranking scale. Under these circumstances, the functional role assignments by sector would merely duplicate the functional class of each urban place.

Additional information would be necessary in order to derive a more sensitive ranking scale as reflected in the Mature-State. For example, given 1971 census data (when it becomes available), one could use Maxwell's equation to calculate excess employment by economic sector over and above the minimum requirements and from this develop a rating scale based on the relative excess. We recommend further research along this line, partly in order to establish the functional role of the COLUC urban places in 1971 as well as 1986 and 2001, and also as a means of validating the functional role rating scales and assignments of the Mature-State.

PART III

DISCUSSION OF CONTROL TOTALS

As noted in Part I, we decided to accept the control totals of population and employment supplied by the COLUC working group for 1971, 1986, 2001 and the Mature-State, with the exception of the changes noted previously. However, these control totals merit some discussion.

Population

The population control totals are reproduced here for convenience:

	1971	1986	2001	Mature-State
		(in 000's)		
COLUC - Total Population	3,325	4,429	5,647	7,229
- Urban Population	3,092	4,129	5,260	6,700

These control totals suggest the following comments:

1. The control totals for the COLUC area in 1986 and 2001 were obtained by what is known as the "share" method. This has two general and, in this case, two particular disadvantages, namely,

   (i) the share method is at best unsophisticated and gives highly uncertain results;

   (ii) it does not provide an age and sex distribution of the population, and consequently does not show how a smaller or larger share will affect the age and sex distribution. This is important from several points of view, notably the labour force, housing and the rate of future population growth;

(iii) the projections of Ontario's population in 1986 and 2001 from which the COLUC area's share was taken have since been found to be in error. Revised projections in which the error has been corrected have been made and were kindly supplied to the Consultants by Mr. R. Kogler, of the Economic Analysis Branch, T.E.I.G.A. A copy of these projections is attached as Appendix 2 to this report. The COLUC control total as a percentage of the revised estimates is as follows:

Exhibit 7:
COLUC Population Totals As % of Ontario

	1971	1986	2001	Mature-State
		(in 000's)		
Ontario	7,703	9,753	11,646	14,600
- Percent in COLUC	43.3%	45.4%	48.5%	49.5%

(iv) the increase in the share from 1986 to 2001 is greater than in the preceding 15 years from 1971 to 1986, and again greater than in the ensuing years to the Mature-State. The high share in 2001 implies that in-migration to the COLUC area will accelerate in 1986-2001 compared to 1971-86, whereas it would seem more appropriate to attempt to slow down this in-migration. In other words, a slowing down of the rate of concentration of Ontario's population in the COLUC area would seem to be more in conformity with planning goals.

2. The rural residual population in 1971 resulting from the above is 233,000. This is equal to 7.0% of the COLUC area total. In 1986, the rural residual population accounts for 6.8% of the area's total, in 2001 to 6.9% of the total and in the Mature-State to 7.3%. Thus, the rural residual remains a more or less constant proportion of the COLUC area total, whereas it would seem to us that, in line with the planning goals for the area, the proportion in the rural areas should decline.

3. Using the estimates by county of the revised population projections for Ontario, we obtained a population for the COLUC area of 4,393,000 in 1986 and 5,383,000 in 2001. These figures represent 45.0% and 46.3% of the estimated Ontario population in the respective years, and thus imply a decelerated rate of inmigration into the COLUC area. The difference in 1986 between our figure and that of the COLUC working group (4,393,000 vs. 4,429,000) is small, whereas the difference in 2001 of 250,000 (5,383,000 vs. 5,647,000) is more significant.

4. A further advantage of the foregoing figures is that, when projected beyond 2001 at appropriately declining growth rates, a Mature-State population for the COLUC area of 7,150,000 is reached in 2031 rather than the COLUC working group's higher figure of 7,229,000 already by 2021. The later date is preferable, since together with the lower growth rates it provides more time for a lower ultimate population to be approached and thus, at the same time, makes it more realistic to assume that the assumed Mature-State population would not be significantly exceeded later on. If on the other hand, the Mature-State population were to be reached in the linear manner illustrated in Forecast "A" of Figure 1 in the Mature-State document, the

assumption that the population involved would in fact turn out to be the area's approximate ultimate total would probably not be tenable. A declining growth rate for Ontario would mean that the population of 14,600,000 would likewise only be reached in about 2031. The resulting estimates from 1971 to the Mature-State would then be as shown below. Included in the table are estimates for the combined urban population of the COLUC area which imply a gradually diminishing proportion of the total in the rural areas.

Exhibit 8:
Projected Population
Ontario and COLUC, 1971 to Mature-State

	1971	1986	2001	2016	Mature-State (2031)
			(in 000's)		
Ontario	7,703	9,753	11,646	13,250	14,600
- Growth		1.26	1.194	1.14	1.10
- Annual Rate		1.6	1.2	0.9	0.6
COLUC	3,325	4,393	5,383	6,307	7,150
- Growth		1.321	1.225	1.172	1.134
- Annual Rate		1.87	1.37	1.07	0.85
COLUC as % of Ontario	43.2%	45.0%	46.2%	47.6%	49.0%
COLUC Urban	3,092	4,094	5,028	5,903	6,700
- Growth		1.324	1.228	1.174	1.135
- Annual Rate		1.89	1.39	1.08	0.85
COLUC Urban as % of Total	93.0%	93.2%	93.4%	93.6%	93.7%

We believe that these figures present a coherent pattern of population growth which seems consistent with the goals of Mature-State Plan.

Employment

The control figures of employment for the COLUC area and its 23 urban places supplied by the COLUC working group are reproduced for convenience below:

	1971	1986	2001	Mature-State
		(in 000's)		
COLUC - Total Employment	1,463	2,115	2,708	3,320
- Urban Employment	1,368	2,035	2,558	3,250

These figures suggest the following comments:

1. As already noted in Part I, the control figures for the Mature-State do not correspond with the total obtained from Table 3 of the Mature-State document for the 23 urban places, that is, 3,314,000, to which should be added some employment in the rural areas.

   We have also noted that, according to the 1971 census, total employment by place of residence in the COLUC area was 1,458,000. The 1971 control figure of 1,463,000 appears to be the census total of the 6 counties comprising the COLUC area, before subtracting employment in the excluded parts of Ontario and Durham counties.

2. Although the control total for 1971 of 1,368,000 for the 23 urban places is clearly a great improvement on the TARMS figure, which on the basis of the latest revisions given to us was 1,267,000,

it nevertheless implies a net in-commuting to the 23 urban places of only 11,000. Even if the COLUC area is considered to be self-contained, with no net in-commuting across its boundaries, this figure seems unduly small; if some in-commuting across the COLUC boundaries is added (and no doubt some in-commuting did in fact occur), the figure seems less adequate. It will only be possible to resolve this question when detailed census figures of employment by place of residence as well as by place of work become available; the latter are not expected until this fall.

3. The control figures of employment in 1986 and 2001 were taken from a memorandum dated January 30, 1974, submitted by Harriet DeKoven, of the Policy Section, Regional Planning Branch. The memorandum states that, at the time it was prepared, 1971 census data on the labour force in the COLUC area were not available and consequently the "aggregate employment projections and their sectoral breakdown are based mainly on historical trends modified by slackened population growth." The memorandum adds that "the absence of a consistent data base at the sub-provincial level has tended to obscure historical trends and render projections even more suspect than usual."

These statements are not quoted in order to deprecate the value of the estimates at the time they were prepared. However, as more of the 1971 census data becomes available, it is evident that the estimates will require review.

Thus, we note that the memorandum contains no reference to the population projections which were used as a guide, although it would seem that they were not those which C. Wong provided for the COLUC working group (see paper entitled Task Number 7 - Population Allocations to Urban Places, 1986 and 2001). The

activity rates for 1986 and 2001 calculated by the working group were thus based on two unrelated series of forecasts, for population and employment respectively; the rates should accordingly be viewed with caution. In particular, although acceptable for working purposes, we would hesitate to endorse an activity rate of 48.4% for 1986 as compared with 44% in 1971 and 48% for 2001. The difficulty which the 1986 rate entails for the allocation of employment by sub-region and urban place has been noted earlier.

4. As the work of the COLUC Task Force proceeds, it will be necessary in our view to prepare:

   (a) revised population forecasts for the COLUC area, including the distribution by sex and age. These projections should embody the most realistic assumptions possible as to fertility, mortality and migration to the turn of the century. Beyond that, a range of forecast should be prepared, illustrating the effects of alternative assumptions as to fertility and migration, since these are the two factors which most affect the age structure. The importance of this structure from the policy point of view need not be re-emphasized;

   (b) revised forecasts of the labour force and employment for the COLUC area based, on the one hand, on the population projections noted in (a) and on the other on realistic estimates of labour force participation rates by age and sex, taking into account the 1971 rates indicated by the census. Employment can then be estimated on the basis of alternative rates of unemployment, which in recent years has varied between 5% and 7%;

In particular, this would provide quantitative evidence on the question of the appropriate overall labour force participation and activity rates;

(c) allocations of the labour force and employment, both by place of residence and by place of work, to the 23 urban places in light of the detailed 1971 census data as these become available.

PART IV

COMMENTS REGARDING THE MATURE-STATE

Four elements combine to define the Mature-State Plan. They are:

- the physical boundaries of the urban envelopes,
- the population and employment allocations,
- the functional roles assigned to the urban places, and
- the functional class of these urban places.

The Mature-State is the result of planning preferences with respect to each of these elements, and the manner in which the preferences are integrated into an urban system.

Two questions naturally arise in connection with these preferences. The first question is, what are the criteria which the preferences express and in terms of which they are articulated? In technical language, what is the utility function which the preferences are intended to maximize? The second question is, is the Mature-State Plan resulting from these preferences feasible? What are its costs and its benefits, and is there a satisfactory ratio between the two?

We shall make some comments on each of the four elements of the Mature-State Plan insofar as the first question is concerned. The Mature-State document does not deal with the second question, which is also outside our terms of reference. Nevertheless, this second question ought in the reasonably near future to become a significant focus of the Task Force's attention and study, and should also include the evaluation of alternative growth paths to the Mature-State. It is to this second question that some of our proposals for further research are directed.

DEFINITION OF URBAN ENVELOPES

We shall not comment on this element of the Mature-State Plan beyond noting the two main points which have been made by others, namely:

(i) the appropriate width of the Parkway corridor and whether all of the functions intended for it of buffer, service and transportation corridor, and open space for recreation can effectively be combined, particularly to the west of Metro Toronto where it is divided into two; and

(ii) whether open space for recreation purposes could more effectively be provided in and near the river valleys running north-south from Lake Ontario.

POPULATION AND EMPLOYMENT

The method governing population allocations is stated on page 12 of the Mature-State document. In addition, the general objective is to provide for the population growth anticipated in the COLUC area in such a way as to produce urban places of a wide range of sizes, thus giving residents a corresponding range of choice in the size of city in which they wish to live.

The Mature-State document notes, however, that the area of some urban places is more than sufficient, at the prevailing and planned densities, to accommodate the population allocated to them, whereas the area of others is too small. It follows that either the area of these places will have to be enlarged, with corresponding boundary changes, or the population allocations will have to be reduced, or the densities increased. Although for the COLUC urban complex as a whole, there appears to be a rough balance between the total area of the urban envelopes and the area required for the population growth envisaged,

it is to be noted that the excess of population is relatively greater in the Oshawa sub-region, and especially so immediately to the east of Metro Toronto, than it is in the Mississauga sub-region, while in the Hamilton sub-region there appears to be a substantial surplus of available land. This imbalance is not without relevance to the problem, discussed earlier in our report, of accelerating growth to the east of Metro Toronto. The population allocated to the Aurora-Newmarket sub-region is also in excess of the area of the urban envelopes envisaged, by a margin of 100%. The Mature-State document notes that this difficulty with respect to population allocations remains to be resolved.

A second, specific problem is the location of North Pickering. If the second airport is built, this location makes sense, notwithstanding that its dominant orientation will almost inevitably be towards Toronto rather than Oshawa. If on the other hand the second airport is not built, consideration should be given to an alternative location further east, a possible combination with Audley or a sharing between Audley and Columbus. This point has been made before, among others by the OAPAD Study in which our two firms were involved. The OAPAD Study concluded that, in order to ensure functional as well as physical separation from Metro Toronto and a predominant orientation towards Oshawa, the first second tier centre to be developed in the Study Area should be to the north and slightly to the west of Oshawa. We retain this view, and suggest that it would be appropriate to work out an alternative Mature-State Plan for the Oshawa sub-region on the assumption that the North Pickering airport will not be built.

The population allocations are of course closely related to those of employment. These allocations rest on the fundamental criterion of employment decentralization, combined with diversification and specialization of urban places in a hierarchical system. The split between manufacturing, construction and wholesaling (M and W) employment

on the one hand and retail, service and other (RSO) employment on the other by sub-region and by individual urban place within the sub-regions further implies a preference for a marked acceleration of RSO employment in the main centres outside Metro Toronto in comparison with a relatively stable split between these two categories in Metro Toronto itself. It is not clear whether this acceleration expresses a preference per se for RSO employment in the outlying centres; whether it is viewed as the most feasible and effective way of decentralizing employment; whether instead it is considered the necessary means of achieving the urban hierarchical structure and dominant orientations of the Mature-State system, or possibly a combination of all three.

We have noted this aspect of the employment allocations earlier in our report, and refer to it here to underline its importance and our view that it merits further study, with special reference to locational factors as discussed below.

FUNCTIONAL ROLE

Functional roles of urban places are defined in terms of twelve economic activities. These activities, together with the estimated service area population of each urban place, combine to define the functional class of each place. A hierarchy of urban places is then established, determined by the range, type and level of goods and services which they provide. In addition, urban places of the same functional class are assigned specific functional roles, based on specialization in one or more of the twelve economic activities. Several issues are involved here.

1. An initial difficulty is that not enough is known about the functional role of the urban places in the COLUC area at the present time, what these roles in fact are, and what (if anything) differentiates one urban place of roughly the same size from another. It would seem that a substantial amount of research is needed before we know accurately where we are and hence how to get to where we want to go.

2. A rating scale is established for each of the twelve economic activities, with four, five or six classes dividing it into corresponding hierarchical levels. The different classes of each activity are then "arrayed so as to bring as near as possible to the consumers themselves the highest level of services which is affordable consistent with the economies of scale for that activity and service level". However, the different service levels are not defined and the criteria by which the hierarchical level of each activity in the various urban places was determined are not indicated. It is consequently not clear what level of services it will be possible to obtain in each urban place. In some cases, for example education, which is discussed in the Mature-State document, the criterion is clear enough. The same would apply to retailing, which depends on trade area, and perhaps to health and government services. We had particular difficulty with the rating scale for the three types of manufacturing industry, namely, complex, footloose and city serving.

3. The three types of manufacturing are defined as follows: "The complex related industries are provincially and nationally oriented; the footloose industries are regionally oriented; and the local city serving industries are urban place oriented." These three types are assumed to account for 50%, 35% and 15% respectively of total manufacturing employment in the Mature-State. Accepting for a moment the above definition of the three types, it would be interesting to know how the total was in fact

divided in 1971 and whether changes in the division are taking place over time. Without some study of this point, the postulated division of employment between the three types in the Mature-State is inevitably conjectural.

However, the definition of complex and footloose industries appears to us unsatisfactory. Complex industries are essentially those for which proximity to raw materials or other inputs or to other industries which make use of their output is essential; they must be close together either for reasons having to do with the processes of production or because physical separation would entail prohibitive transportation costs. Footloose industries on the other hand are those for which transportation costs and proximity to markets are relatively unimportant. Such industries can serve a national as well as a regional market. Although, as the term implies, the factors determining the location of footloose industries are not so obvious and clear-cut as in other cases, these industries do presumably have locational preferences, and it does not follow that their generalized locational costs are equal over the whole COLUC region. The locational preferences of these industries merit study, in order to be able to evaluate the costs of influencing their location in such a way as "strategically to reinforce the Mature-State Plan".

4. The Mature-State document defines specialization as "the concentration of a particular activity in an urban place. The degree to which an activity is specialized in an urban place is dependent upon a trade-off between the benefits an activity derives from economies of scale and of agglomeration on the one hand, and transportation costs on the other. Scale economies vary by industry and consequently an activity characterized by very large scale economies may be expected to be more concentrated,

..... (whereas) an activity with high transportation costs may be expected to be relatively more dispersed than one with lower transportation costs".

This is a well accepted statement of the main factors governing the location of goods producing industries, and explains how the great concentrations of specialized industries usually came about owing to changes in transportation technology and costs. Larger, capital intensive industries were thus able to invade the market areas of smaller, less developed ones.

However, we believe that the above constitutes a less satisfactory statement of the factors governing the location of services. The extent and reasons for scale economies in the provision of the growing range of services which a modern economy affords are relatively unknown, while the transportation (and communication) costs involved are mainly those with customers and clients. Since the decentralization of employment in the Mature-State Plan depends so heavily on service activities, it is important that these matters be better understood and in particular that the sensitivity of locational decisions to possible government intervention and incentives be explored.

5. The Mature-State document assumes that higher order goods or services must be located in a centre with an appropriately large service area population. This is no doubt so where direct access and face-to-face contact is necessary. But it is less so for those services, and particularly for the production of goods, where other locational requirements, notably the price of land, are important and where the market extends beyond the COLUC area. For these goods and services, the

hierarchical ranking may not correspond with urban size; the largest urban places will not necessarily have the highest level of these activities.

6. These activities may perhaps be exceptions. According to Table 3 of the Mature-State document, reproduced in our Table 7D of Appendix 1, the four largest centres, namely, Metro Toronto, Hamilton, Mississauga and Oshawa, rank high on the rating scales of most of the twelve economic activities. Except in the case of Metro Toronto, these ratings express the principle of decentralized employment.

   In the case of the urban places below these four in the hierarchical scale, the criteria governing the preferred functional role assigned to each urban place are not clear. There is a general guideline that "the specialization of an urban place should complement other urban place specialities both within the total system, as well as within the sub-systems", but a number of the assignments nevertheless appear somewhat arbitrary and not based on the twin factors of economies of scale and agglomeration on the one hand, and transportation costs on the other. For example, why should North Oakville be rated II for education but only V for wholesaling, whereas Oakville whose service area population is more than twice as large ranks III in both of these? Again, why does Brampton-Bramalea have a lower footloose manufacturing rating than Erin Mills, although in the other two types of manufacturing they rank the same? As another example, why is Columbus ranked II in education whereas Oshawa, to which it is intended to have a dominant orientation, ranks III? In practice, does this mean that the university in the Oshawa sub-region will be located in Columbus rather than Oshawa, and if so, why?

These are matters which the formulation of criteria governing the assignment of specialized functional roles would help to clarify.

FUNCTIONAL CLASS

The functional class of each urban place depends on its service area population, which in turn, depends on the postulated system of dominant orientations.

As we have noted, the postulated system of dominant orientations does not exist at present. A "chicken-and-egg" process is involved in bringing it about. On the one hand, Mississauga for example will not become a magnet determining the dominant orientation of the other urban places in its sub-region unless the higher order goods and services which will create this orientation locate there. On the other hand, in the private sector of the economy, where market and profit considerations govern location, these higher order goods and services will hesitate to locate in Mississauga until they are assured of attracting customers and clients from the sub-region in accordance with the predominant orientations postulated. Public services, subject to government decision as to their location, are of course another matter, and it may be that these will be sufficient to act as the necessary catalyst.

Nevertheless, as mentioned earlier, far too little is known about the locational factors of the many activities which together comprise the service sector. This sector will account for 70% of employment in the Mature-State, possibly more, and closer to 80% of the newer employment to be added between now and the Mature-State. Here is a large field where, we believe, new knowledge and understanding gained through further research is likely to be crucial to the achievement of the Mature-State Plan.

PART V

SUGGESTIONS FOR FURTHER RESEARCH

Our suggestions for further research work are directed towards three related objectives:

(i) increased knowledge and understanding of the COLUC system in its present state;

(ii) refinement of the Mature-State Plan in terms of the unresolved aspects dealt with in Part IV and an examination of the costs and benefits of alternative policies by which the Mature State Plan might be implemented, and

(iii) the feasibility of alternative development paths to the Mature-State, in order to gain some idea of the costs and benefits of alternative population and employment allocations in 1986 and 2001. We are particularly conscious of the lack of hard knowledge under this third head, since within the severely limited time available to us we had to rely in our allocations so largely on intuitive professional judgment.

The suggestions which follow do not address themselves only to one or other of these three purposes; some of them concern two and others all three of them.

1. Population and Employment Forecasts

As we noted at the conclusion of Part III, presently available population and employment forecasts require review. Although we accepted for working purposes the control totals given to us,

these should be regarded as a first rather than the last word on the subject. Alternative forecasts resulting from clearly stated assumptions will indicate the probable upper and lower limits of the magnitudes considered. This would be of no small value in view of the wide range of some of these magnitudes within which discussion at present takes place.

For example, the population forecasts which have been made in Canada have invariably assumed that the "desired" or "required" migrants will be available. Since the majority of the Canadian population is now urban, a large part of the migrants must come from other urban areas or from abroad. A multi-regional forecast would reveal whether the growth assumptions for different regions are compatible with the available "supply" of migrants and what their implications might be for immigration from abroad. The population forecast would take full account of the Canadian Immigration and Population Study being undertaken by the federal Department of Manpower and Immigration.

As to future employment and the labour force, it is not sufficient to assume that all of those of working age will find employment. One must evaluate the growth prospects of each of the relevant economic sectors and thus the growth prospects of the COLUC area as a whole.

2. Inter-Regional Input-Output Model

A sub-regional and inter-regional input-output model of the provincial economy is desirable. The data base available from the provincial model could be used to create such a sub-regional and inter-regional model, which would however be in a significantly less disaggregated form than the provincial model. The model would segregate the COLUC area and a suitable number of adjacent

areas which are economically linked to COLUC. The model would reveal the strongest linkages, and would give some insight into which industries could be best influenced to settle in the Oshawa area in view of these linkages.

3. An Economic Base Study

The economic base study would concentrate on the current state of the COLUC system, especially upon those aspects of the economy which are not covered by the input-output analysis. The study should deal in particular location and spatial aspects of the system. The study should cover specifically:

- labour force characteristics;
- employment and manpower;
- cost aspects of economic linkages over space;
- markets and market orientation;
- transportation requirements and the influence of costs;
- all other costs (land cost, rent, taxes) influencing location.

The study would provide the means for evaluating within a comprehensive and integrated framework, the effectiveness of possible incentives or other policies which might be proposed for the purpose of implementing the Mature-State Plan.

4. The Service Industries

Particular attention needs to be focused on the service sector. Much information relevant to the industries in this sector will be obtained by the input-output model and the economic base study.

Current economic analysis still pays a great deal of attention to manufacturing industries, which is a bias of earlier decades. Our economic data collection is similarly biased. Since the economic importance of services is growing and the COLUC area will increasingly be an exporter of services, it is important to improve the current state of the art, distinguishing between commercially available services, in particular soft services, and government financed services. Locational factors - aggregation, proximity to complementary services, access to customers and clients, transportation costs and others - require special attention.

5. Provincial Policies

The COLUC concept assumes a radical change in the spatial distribution of people and employment. Without active government intervention the centre of gravity of the COLUC area would continue to move to the west and employment would become more concentrated in Metro Toronto. There is therefore a need to list and evaluate all possible provincial policies (incentives, regulations, direct government intervention) which could move the development of the area towards the state described as Mature.

A study should also review and evaluate for cost-effectiveness all existing and projected provincial policies which could be applied to the achievement of the Mature-State Plan and the preferred phasing leading to it, and should investigate the feasibility of such additional policies which might be suitable for this purpose.

APPENDIX 1

TABLE AND CHARTS - POPULATION AND EMPLOYMENT ALLOCATIONS, 1971, 1986, 2001 AND MATURE-STATE

TABLE 1

POPULATION ALLOCATIONS

	1971	1986	2001	Mature State
Metro Toronto	2,104	2,480	2,740	2,900
Aurora/Newmarket Sub Region				
Aurora/Newmarket	30	44	67	150
Richmond Hill	25	47	60	95
Woodbridge	3	7	14	20
Markham	11	21	24	35
Total	69	119	185	300
Mississauga Sub Region				
Mississauga	143	280	350	440
Oakville	57	105	150	200
Erin Mills	9	60	160	270
North Oakville	1	4	77	150
Brampton/Bramalea	65	125	200	280
Malton	18	25	30	35
Georgetown	17	26	33	40
Total	310	625	1,000	1,415
Hamilton Sub Region				
Hamilton	354	475	595	700
Burlington	80	105	130	150
North Burlington	1	2	4	75
Milton	7	13	16	20
Total	442	595	745	945
Oshawa Sub Region				
Oshawa/Whitby	115	180	254	450
North Pickering	2	34	106	200
South Pickering	21	40	70	120
Ajax	17	34	65	120
Columbus	1	1	60	150
Bowmanville	8	15	18	30
Audley	3	6	17	70
Total	167	310	590	1,140
Total Urban COLUC	3,092	4,129	5,260	6,700

TABLE 2

TOTAL EMPLOYMENT

	1971	1986	2001	Mature State
Metro Toronto	1002.6	1,277	1,370	1,450
Aurora/Newmarket Sub Region				
Aurora/Newmarket	8.4	25.0	44.0	96
Richmond Hill	7.2	13.0	19.0	23
Woodbridge	1.1	4.0	9.0	13
Markham	2.8	6.0	7.0	9
Total	19.5	48.0	79.0	141
Mississauga Sub Region				
Mississauga	36.8	133.0	188.0	254
Oakville	18.4	48.0	73.0	101
Erin Mills	2.4	9.0	42.0	85
North Oakville	-	1.0	18.0	36
Brampton/Bramalea	25.9	37.0	61.0	89
Malton	28.6	42.0	52.0	64
Georgetown	4.3	7.0	9.0	10
Total	116.4	277.0	443.0	639
Hamilton Sub Region				
Hamilton	142.5	250.0	335.0	450
Burlington	21.6	39.0	53.0	65
North Burlington	-	-	-	16
Milton	3.2	3.0	2.0	3
Total	167.3	292.0	390.0	534
Oshawa Sub Region				
Oshawa	49.3	91.0	136.0	245
North Pickering	.5	25.0	78.0	155
South Pickering	2.6	10.0	18.0	36
Ajax	6.3	10.0	16.0	36
Columbus	-	-	18.0	47
Bowmanville	3.5	4.0	5.0	7
Audley	-	1.0	5.0	24
Total	62.2	141.0	276.0	550
Total Urban COLUC	1,368	2,035	2,558	3,314

TABLE 3

1971 EMPLOYMENT
(Interpolated Weights)

	Total	M & W	RSO
Metro Toronto	1002.6	353.6	649.0
Aurora/Newmarket Sub Region			
Aurora	8.4	2.5	5.9
Richmond Hill	7.2	2.9	4.3
Woodbridge	1.1	.5	.6
Markham	2.8	1.3	1.5
Total	19.5	7.2	12.3
Mississauga Sub Region			
Mississauga	36.8	14.5	22.3
Oakville	18.4	9.6	8.8
Erin Mills	2.4	1.4	1.0
North Oakville	-	-	-
Brampton/Bramalea	25.9	15.0	10.9
Malton	28.6	14.0	14.6
Georgetown	4.3	2.1	2.2
Total	116.4	56.6	59.8
Hamilton Sub-Region			
Hamilton	142.5	67.8	74.7
Burlington	21.6	7.2	14.4
North Burlington	-	-	-
Milton	3.2	1.1	2.1
Total	167.3	76.1	91.2
Oshawa Sub Region			
Oshawa	49.3	26.2	23.1
North Pickering	.5	.1	.4
South Pickering	2.6	.3	2.3
Ajax	6.3	3.0	3.3
Columbus	-	-	-
Bowmanville	3.5	1.1	2.4
Audley	-	-	-
Total	62.2	30.7	31.5
Total Urban COLUC	1,368	524.2	843.8

TABLE 4

1986 EMPLOYMENT
(Exponential-Interpolation)

	Total	M & W	RSO
Metro Toronto	1277.0	423.0	854.0
Aurora/Newmarket Sub Region			
Aurora	25.0	6.4	18.6
Richmond Hill	13.0	4.8	8.2
Woodbridge	4.0	2.3	1.7
Markham	6.0	3.1	2.9
Total	48.0	16.6	31.4
Mississauga Sub Region			
Mississauga	133.0	46.1	86.9
Oakville	48.0	20.4	27.6
Erin Mills	9.0	4.2	4.8
North Oakville	1.0	0.4	0.6
Brampton/Bramalea	37.0	18.3	18.7
Malton	42.0	22.6	19.4
Georgetown	7.0	3.2	3.8
	277.0	115.3	161.7
Hamilton Sub Region			
Hamilton	250.0	101.3	148.7
Burlington	39.0	13.4	25.6
North Burlington	-	-	-
Milton	3.0	1.0	2.0
Total	292.0	115.8	176.2
Oshawa Sub Region			
Oshawa	91.0	41.8	49.2
North Pickering	25.0	5.0	20.0
South Pickering	10.0	1.8	8.2
Ajax	10.0	4.9	5.1
Columbus	-	-	-
Bowmanville	4.0	1.5	2.5
Audley	1.0	0.3	0.7
Total	141.0	55.3	85.7
Total Urban COLUC	2035.0	726.0	1309.0

TABLE 5

2001 EMPLOYMENT
(Exponential-Interpolation)

	Total	M & W	RSO
Metro Toronto	1370.0	438.7	931.3
Aurora/Newmarket Sub Region			
Aurora	44.0	9.7	34.3
Richmond Hill	19.0	6.4	12.6
Woodbridge	9.0	6.3	2.7
Markham	7.0	3.9	3.1
Total	79.0	26.0	53.0
Mississauga Sub Region			
Mississauga	188.0	57.6	130.4
Oakville	73.0	23.9	49.1
Erin Mills	42.0	14.5	27.5
North Oakville	18.0	5.4	12.6
Brampton/Bramalea	61.0	24.6	36.4
Malton	52.0	29.8	22.2
Georgetown	9.0	3.9	5.1
Total	443.0	159.8	283.2
Hamilton Sub Region			
Hamilton	335.0	116.5	218.5
Burlington	53.0	19.3	33.7
North Burlington	-	-	-
Milton	2.0	0.6	1.4
Total	390.0	136.4	253.6
Oshawa Sub Region			
Oshawa	136.0	43.9	92.1
North Pickering	78.0	17.3	60.7
South Pickering	18.0	6.7	11.3
Ajax	16.0	7.7	8.3
Columbus	18.0	5.4	12.6
Bowmanville	5.0	2.4	2.6
Audley	5.0	2.4	2.6
Total	276.0	85.6	190.4
Total Urban COLUC	2558.0	846.5	1711.5

TABLE 6

MATURE STATE EMPLOYMENT

	Total (000's)	M & W (000's)	RSO (000's)
Metro Toronto	1450	470	980
Aurora/Newmarket Sub Region			
Aurora/Newmarket	96	21	75
Richmond Hill	23	8	15
Woodbridge	13	11	2
Markham	9	6	3
Total	141	46	95
Mississauga Sub Region			
Mississauga	254	66	188
Oakville	101	22	79
Erin Mills	85	19	66
North Oakville	36	7	29
Brampton/Bramalea	89	27	62
Malton	64	40	24
Georgetown	10	4	6
Total	639	185	454
Hamilton Sub Region			
Hamilton	450	133	317
Burlington	65	27	38
North Burlington	16	5	11
Milton	3	1	2
Total	534	166	368
Oshawa Sub Region			
Oshawa	245	52	193
North Pickering	155	26	129
South Pickering	36	11	25
Ajax	36	14	22
Columbus	47	11	36
Bowmanville	7	3	4
Audley	24	10	14
Total	550	127	423
Total Urban COLUC	3,314	994	2,320

TABLE 7-A

COLUC 1971 STATE: SUMMARY BY URBAN PLACE OF FUNCTIONAL CLASS, POPULATION, EMPLOYMENT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(22)	(23)	(24)	(25)
				PREFERRED POPULATION (000'S)								
Area	Functional Class	Dominant Orientation	Urban Place	ESA	ESA(2)	ESA(3)	Total Service Area	Columns (9) to (21) TSA	Residential Employees	EMPLOYMENT (000'S) Service	Total	Net
TORONTO	I		2,104	1,221	1,320	2,658	7,303		957.6	649.0	1,002.6	+45.0
HAMILTON	II	Toronto	354	137	900		1,391		141.7	74.7	142.5	+ 0.8
OSHAWA	IV	Toronto	115	35	140		290		44.0	23.1	49.3	+ 5.3
MISSISSAUGA	IV	Toronto	143	-	-		143		60.2	22.3	36.8	-23.4
OAKVILLE	V	Toronto	57	1			58		24.0	8.8	18.4	- 5.6
AURORA/NEWMARKET	V	North Toronto	30	79	-		109		11.8	5.9	8.4	- 3.4
NORTH PICKERING	VI		2	-			2		0.8	0.4	0.5	- 0.3
BURLINGTON	V	Hamilton	80	13			93		32.7	14.4	21.6	-11.1
ERIN MILLS	VI	Toronto	9	-			9		3.8	1.0	2.4	- 1.4
NORTH OAKVILLE	VI		1	-			1		0.4	-	-	- 0.4
BRAMPTON/BRAMALEA	V	Toronto	65	44	-		109		27.4	10.9	25.9	- 1.5
SOUTH PICKERING	VI	Toronto	21	-			21		8.0	2.3	2.6	- 5.4
AJAX	VI	Toronto	17	-			17		6.5	3.3	6.3	- 0.2
COLUMBUS	VI		1	2			3		0.4	-	-	- 0.4
NORTH BURLINGTON	VI		1	-			1		0.4	-	-	- 0.4
RICHMOND HILL	VI	North Toronto	25	4			29		10.0	4.3	7.2	- 2.8
AUDLEY	VI	Oshawa	3	12			15		1.1	-	-	- 1.1
MILTON	VI	Burlington	7	3			10		2.9	2.1	3.2	+ 0.3
MALTON	VI	Toronto	18				18		7.5	14.6	28.6	+21.1
GEORGETOWN	VI	Brampton/Bramalea	17	11			28		7.2	2.2	4.3	- 2.9
WOODBRIDGE	VI	North Toronto	3	2			5		1.2	0.6	1.1	- 0.1
MARKHAM	VI	North Toronto	11	2			13		4.4	1.5	2.8	- 1.6
BOWMANVILLE	VI	Oshawa/Whitby	8	9			17		3.0	2.4	3.5	+ 0.5
			3,092						1,357.0	843.8	1,368.0	11.0

TABLE 7-B

COLUC 1986 STATE PLAN: SUMMARY BY URBAN PLACE OF FUNCTIONAL CLASS, POPULATION, EMPLOYMENT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(22)	(23)	(24)	(25)
Area	Functional Class	Dominant Orientation	Urban Place	PREFERRED POPULATION (000'S) ESA	ESA(2)	ESA(3)	Total Service Area	TSA	Columns (9) to (21)	Residential Employees	EMPLOYMENT (000'S) Service	Total	Net
TORONTO	I		2,480	1,949	1,643	3,681	9,753			1,227	854	1,277	+50
HAMILTON	II	Toronto	475	183	1,140		1,798			219	149	250	+31
OSHAWA	III	Toronto	180	125	158		463			80	49	91	+11
MISSISSAUGA	III	Toronto	280	120	-		400			135	87	133	- 2
OAKVILLE	IV	Toronto	105	4			109			50	27	48	- 2
AURORA/NEWMARKET	IV	North Toronto	44	131			175			19	18	25	+ 6
NORTH PICKERING	V	Toronto	34	21			55			17	20	25	+ 8
BURLINGTON	IV	Hamilton	105	29			134			48	26	39	- 9
ERIN MILLS	V	Toronto	60				60			28	5	9	-19
NORTH OAKVILLE	VI		4				4			2	1	1	- 1
BRAMPTON/BRAMALEA	IV	Toronto	125	70			195			59	19	37	-22
SOUTH PICKERING	VI	Toronto	40				40			18	8	10	- 8
AJAX	VI	Toronto	34				34			16	5	10	- 6
COLUMBUS	VI		1	3			4			-	-	-	-
NORTH BURLINGTON	VI		2	-			2			1	-	-	- 1
RICHMOND HILL	V	North Toronto	47	6			53			22	8	13	- 9
AUDLEY	VI	Oshawa	6	16			22			3	1	1	- 2
MILTON	VI	Burlington	13	3			16			6	2	3	- 3
MALTON	VI	Toronto	25				25			13	19	42	+29
GEORGETOWN	VI	Brampton/Bramalea	26	14			40			12	4	7	- 5
WOODBRIDGE	VI	North Toronto	7	3			10			3	2	4	+ 1
MARKHAM	VI	North Toronto	21	3			24			10	3	6	- 4
BOWMANVILLE	VI	Oshawa/Whitby	15	11			26			6	2	4	- 2
			4,129							1,994	1,309	2,035	41

TABLE 7-C

COLUC 2001 STATE PLAN: SUMMARY BY URBAN PLACE OF FUNCTIONAL CLASS, POPULATION, EMPLOYMENT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(22)	(23)	(24)	(25)
		Preferred		PREFERRED POPULATION (000'S)			Total Service	Columns (9) to (21)		EMPLOYMENT (000'S)		
Area	Functional Class	Dominant Orientation	Urban Place	ESA	ESA(2)	ESA(3)	Area TSA		Residential Employees	Service	Total	Net
TORONTO	I		2,740	2,907	1,767	4,232	11,646		1,316	931	1,370	+54
HAMILTON	II	Toronto	595	230	1,227	-	2,052		276	219	335	+59
OSHAWA	II	Toronto	254	358	170	-	782		117	92	136	+19
MISSISSAUGA	II	Toronto	350	505	-	-	855		167	130	188	+21
OAKVILLE	IV	Mississauga	150	77	-	-	227		71	49	73	+ 2
AURORA/NEWMARKET	IV	North Toronto	67	220	-	-	287		29	34	44	+15
NORTH PICKERING	IV	Oshawa	106	104	-	-	210		48	61	78	+30
BURLINGTON	IV	Hamilton	130	22	-	-	152		61	34	53	- 8
ERIN MILLS	IV	Mississauga	160	1	-	-	161		76	28	42	-34
NORTH OAKVILLE	V	Oakville	77	-	-	-	77		36	13	18	-18
BRAMPTON/BRAMALEA	IV	Mississauga	200	98	-	-	298		95	36	61	-34
SOUTH PICKERING	V	North Pickering	70	-	-	-	70		33	11	18	-15
AJAX	V	Oshawa	65	-	-	-	65		31	8	16	-15
COLUMBUS	V	Oshawa	60	4	-	-	64		28	13	18	-10
NORTH BURLINGTON	VI	Burlington	4	20	-	-	24		2	-	-	- 2
RICHMOND HILL	V	Aurora/Newmarket	76	7	-	-	83		34	13	19	-15
AUDLEY	V	North Pickering	65	20	-	-	85		8	3	5	- 3
MILTON	VI	North Burlington	16	4	-	-	20		7	1	2	- 5
MALTON	VI	Brampton/Bramalea	30	-	-	-	30		14	22	52	+38
GEORGETOWN	VI	Brampton/Bramalea	33	18	-	-	51		16	5	9	- 7
WOODBRIDGE	VI	Aurora/Newmarket	14	4	-	-	18		7	3	9	+ 2
MARKHAM	VI	Aurora/Newmarket	28	4	-	-	32		13	3	7	- 5
BOWMANVILLE	VI	Oshawa/Whitby	18	15	-	-	33		9	3	5	- 4
			5,260						2,494	1,712	2,558	+64

TABLE 7-O

COLUC MATURE CONCEPT PLAN: SUMMARY BY URBAN PLACE OF FUNCTIONAL ROLE, POPULATION, EMPLOYMENT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
				PREFERRED POPULATION (000's)				SECONDARY SECTOR			ECONOMIC ROLE BY SECTOR - HIGHEST ORDER ACTIVITY IN TERTIARY & QUATERNARY SECTORS												EMPLOYMENT (000's)	
Area	Functional Class	Preferred Dominant Orientation	Urban Place	ESA	ESA(2)	ESA(3)	Total Service Area TSA	Complex Rating(5)	Footloose Rating(6)	City Serving Rating(6)	Transportation(6)	Communications(4)	Wholesale(6)	Retail (4)	Bus.Serv.(6)	Health (4)	Education (4)	Culture (5)	Government (4)	Preferred Residential Orientation	Residential Employees Activity Rate: 48%	Service	Total	Net
TORONTO	I		2,900	4,329	2,329	5,042	14,600	II	III	I	I	I	I	I	I	I	I	I	I		1,392	980	1,450	+ 58
HAMILTON	II	Toronto	700	356	1,900		?,956	I	III	II	II	II	II	I	II	II	I	I & II	I & II		336	317	450	+114
OSHAWA	II	Toronto	450	757	330		1,537	I	III	III	II	II	II	I	II	II	III	I & II	I & II		216	193	245	+ 29
MISSISSAUGA	II	Toronto	440	I,04I	37		1,518	III	I	III	II	II	II	I	II	II	III	II	II & III		211	188	254	+ 43
OAKVILLE	III	Mississauga	200	151			351	III	III	IV	III	IV	III	III	III	III	III	III	III		96	79	101	+ 5
AURORA/NEWMARKET	III	North Toronto	150	340	25		515		V	IV-V	III	III	IV	III	III	III	III	III	III		72	75	96	+ 24
NORTH PICKERING	III	Oshawa	200	204			404	III	III	IV	III	III	III	II	III	III	III	III	IV		96	129	155	+ 59
BURLINGTON	IV	Hamilton	150	131			281	III	V	IV	IV	IV	IV	III	IV	IV	III	III	IV		72	38	65	- 7
ERIN MILLS	IV	Mississauga	270	1			271	V	III	IV	IV	IV	IV	III	IV	IV	III	IV	IV		130	66	85	- 45
NORTH OAKVILLE	IV	Oakville	150	1			151	IV-V	III	V	IV	IV	V	III	IV	IV	II	IV	IV		72	29	36	- 36
BRAMPTON/BRAMALEA	IV	Mississauga	280	I37	37		454	V	IV	IV	IV	IV	III	II	IV	IV	III	III	IV		134	62	89	- 45
SOUTH PICKERING	IV	North Pickering	120				120	IV	III	IV	IV	IV	IV	III	IV	IV	III	IV	IV		58	25	36	- 22
AJAX	IV	Oshawa	120				I20	III	IV	V	IV	IV	IV	III	IV	IV	IV	IV	IV		58	22	36	- 22
COLUMBUS	IV	Oshawa	150	5			I55	III	IV	IV-V	IV	IV	IV	III	IV	IV	II	IV	IV		72	36	47	- 25
NORTH BURLINGTON	V	Burlington	75	26			I01	IV	IV	VI	V	IV	V	III	V	IV	III	V	IV		36	11	16	- 20
RICHMOND HILL	V	Aurora/Newmarket	95	10			105	V	IV	V	V	IV	III	III	V	IV	IV	IV	IV		45	15	23	- 22
AUDLEY	V	North Pickering	70	28			98	IV	III	VI	V	IV	VI	IV	V	IV	IV	V	IV		33	14	24	- 9
MILTON	VI	North Burlington	20	6			26		VI	VI	VI	IV	VI	IV	VI	IV	IV	V	IV		10	2	3	- 7
MALTON	VI	Brampton/Bramalea	35				35		V	VI	VI	IV	V	IV	VI	IV	IV	V	IV		17	24	64	+ 47
GEORGETOWN	VI	Brampton/Bramalea	40	25			65		VI	VI	VI	IV	VI	IV	VI	IV	IV	V	IV		19	6	10	- 9
WOODBRIDGE	VI	Aurora/Newmarket	20	5			25		VI	VI	VI	IV	VI	IV	VI	IV	IV	V	IV		10	2	13	+ 3
MARKHAM	VI	Aurora/Newmarket	35	5			40		VI	VI	VI	IV	VI	IV	VI	IV	IV	V	IV		I7	3	9	- 8
BOWMANVILLE	VI	Oshawa/Whitby	30	20			50	IV	IV	VI	VI	IV	V	III	VI	IV	IV	V	IV		14	4	7	- 7
			6,700																	See Figure 19	3,216	2,320	3,3I4	+ 98

Notes for Table 7D

Table 7D, representing the Mature-State, is in the same form as Table 3 of the Mature-State document, except that the following changes have been made:

(1) all the lower figures in the range of population and employment estimates have been omitted;

(2) 5,000 population has been added to three of the urban envelopes namely, Brampton-Bramalea, North Burlington and Bowmanville, in order that the total urban population would agree with the control figure of 6,700,000. The necessary changes have also been made in Columns (5) to (8);

(3) the employment figures in Column (22) have been recalculated using a uniform activity rate of 48%; total employment by place of residence in the 23 urban centres thus comes to 3,216,000;

(4) the 200,000 employees held in reserve have been added to the figures in Columns (23) and (24). 20,000 has been allocated to Malton, 70,000 to North Pickering and the other 110,000 according to the method explained in the text. Column (24), representing employment by place of work, thus adds to 3,314,000, representing an activity rate of 49.5%. Column (23) after correcting for an error of 12 in the total, adds to 2,320,000, which is equal to 70% of the total employment of 3,314,000.

(5) the net figures in Column (25), representing the difference between employment by place of work (Column(24)) and employment by place of residence (Column (22)) have been recalculated. The sum of the differences is 98,000; representing the net in-commuting from outside the urban envelopes.

(6) the order of Columns (9) to (20) has been rearranged in order to correspond with the order of the Standard Industrial Classification code.

POPULATION by SUBREGION

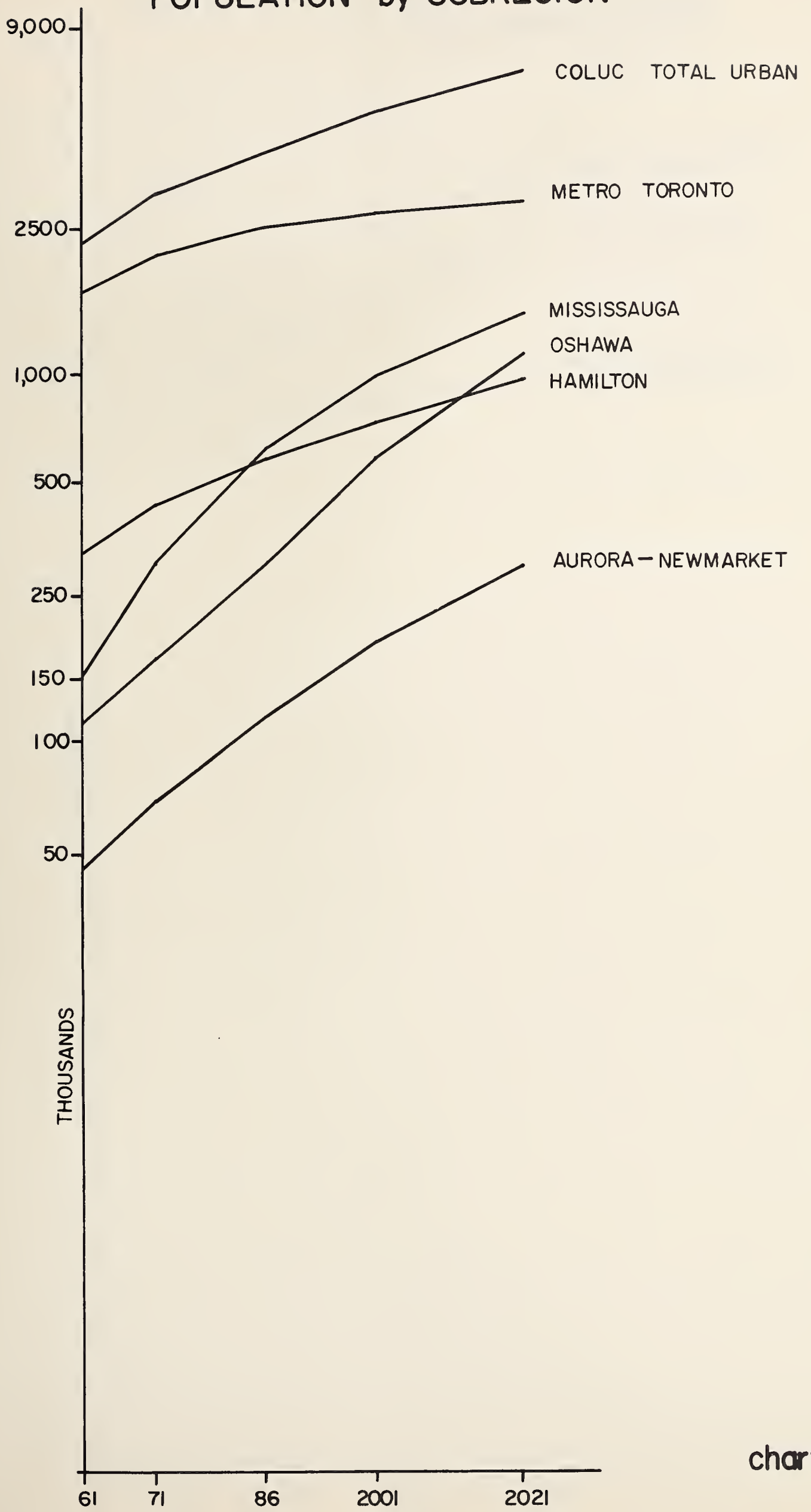

chart 1

COLUC TOTAL URBAN POPULATION and EMPLOYMENT

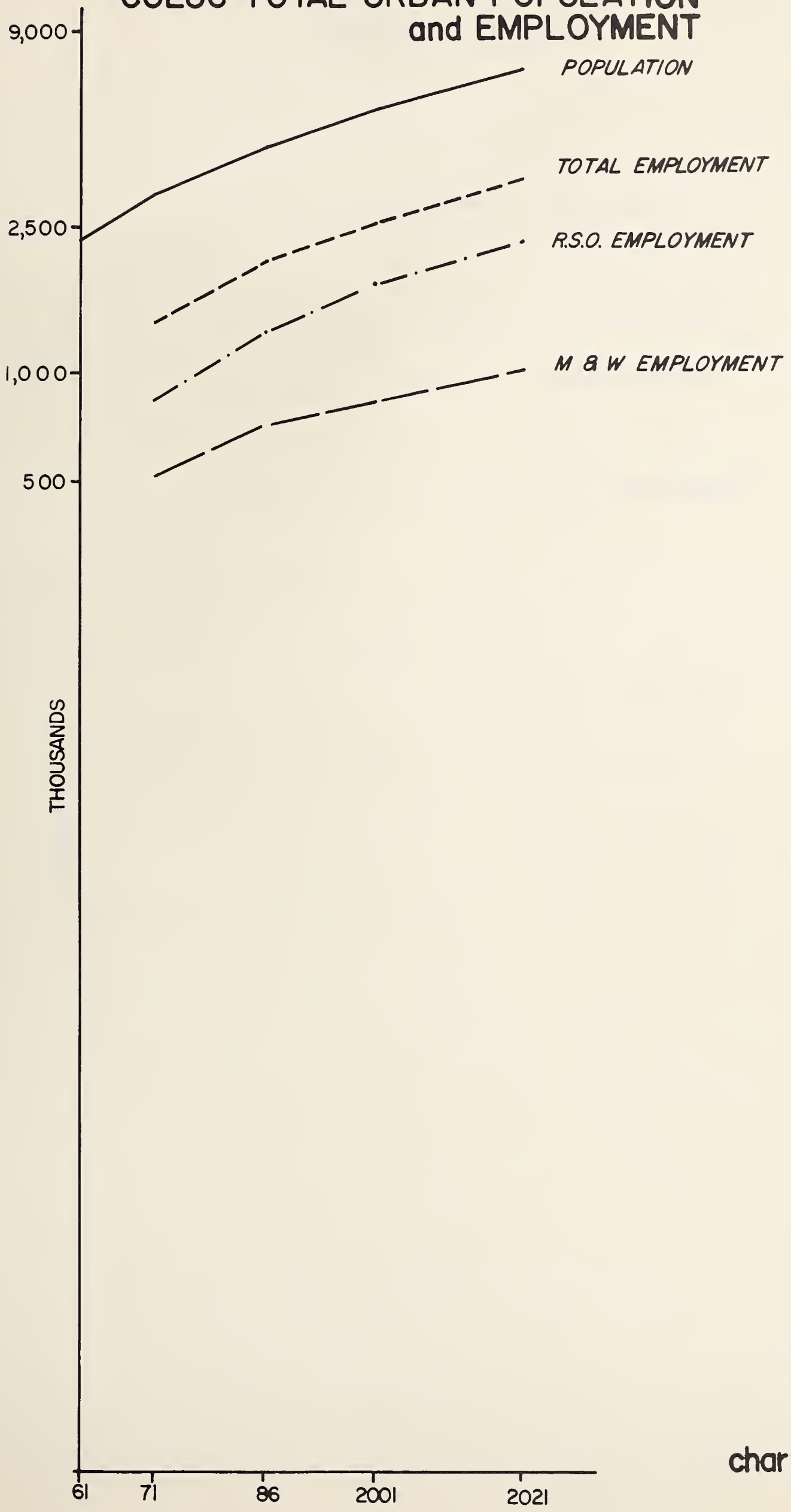

chart 2

METRO TORONTO POPULATION and EMPLOYMENT

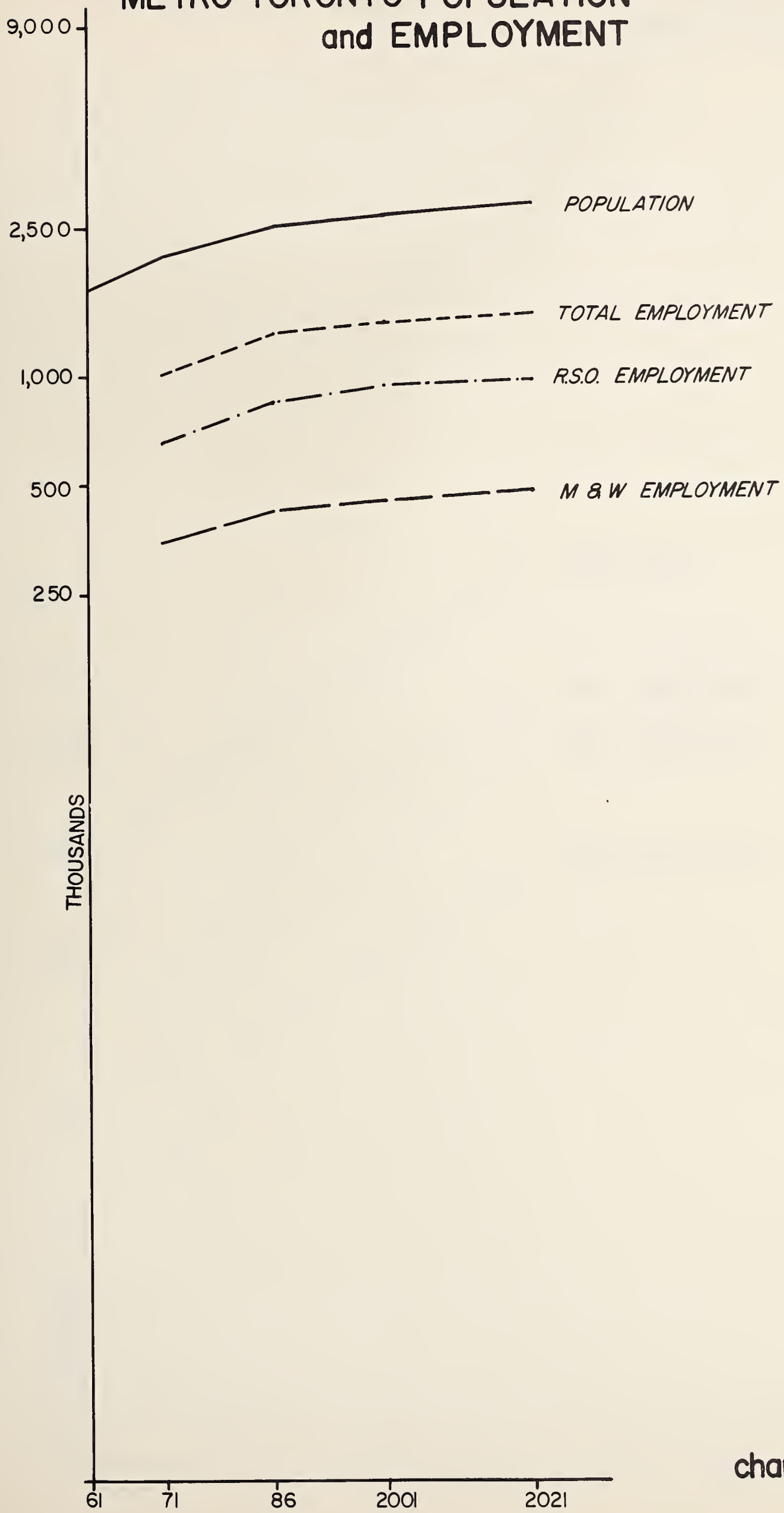

chart 3

AURORA-NEWMARKET SUBREGION POPULATION and EMPLOYMENT

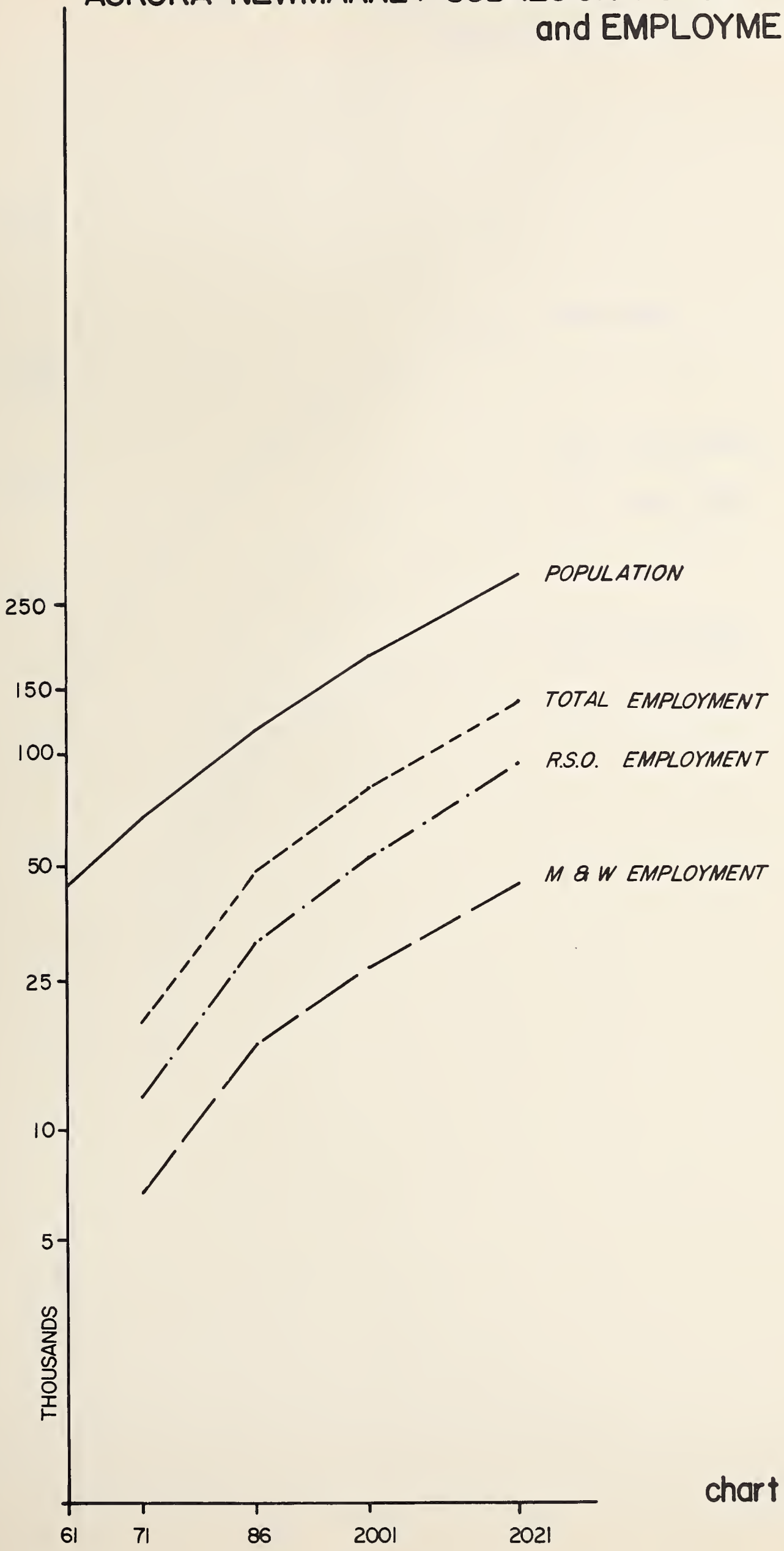

chart 4

MISSISSAUGA SUBREGION POPULATION and EMPLOYMENT

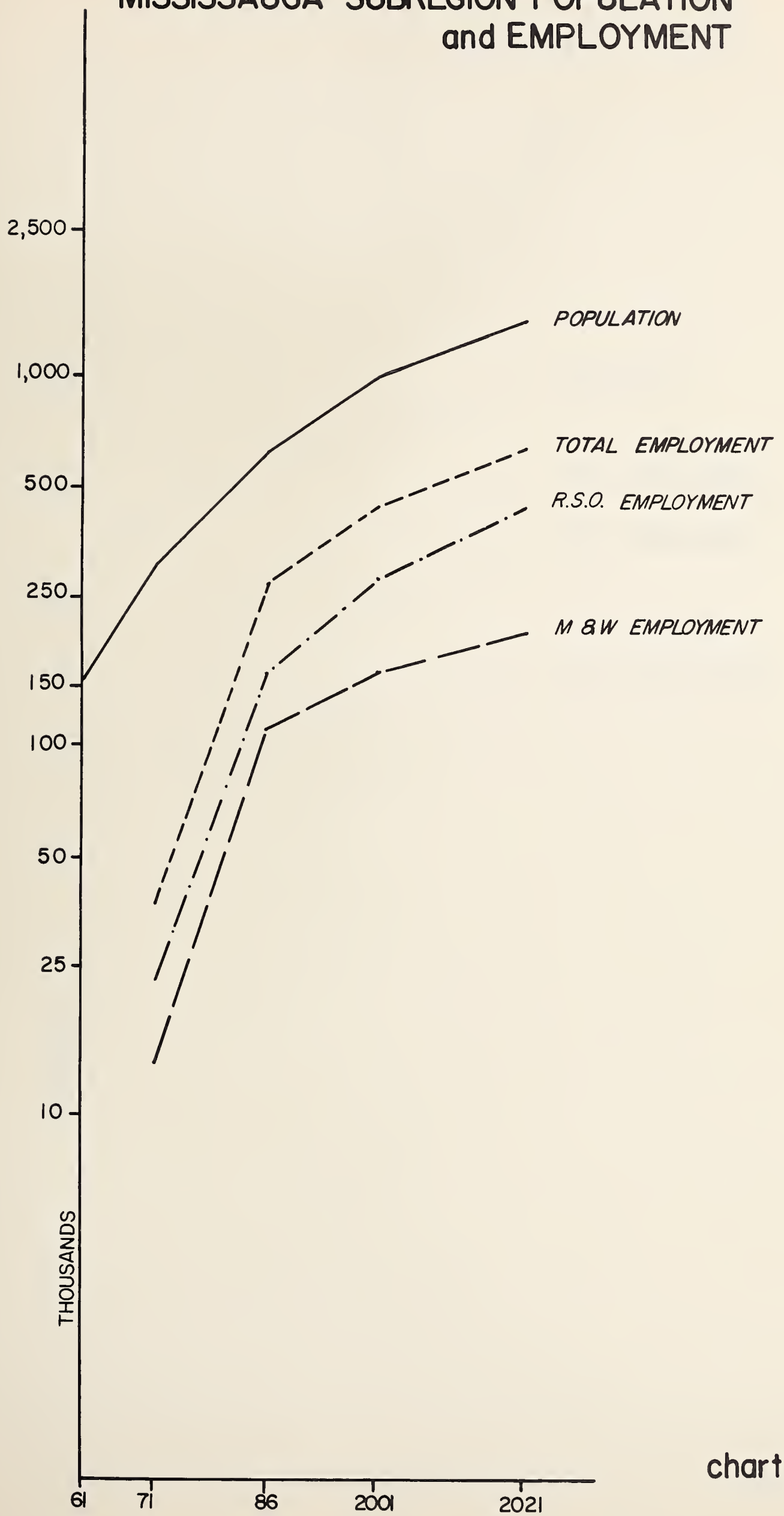

chart 5

HAMILTON SUBREGION POPULATION and EMPLOYMENT

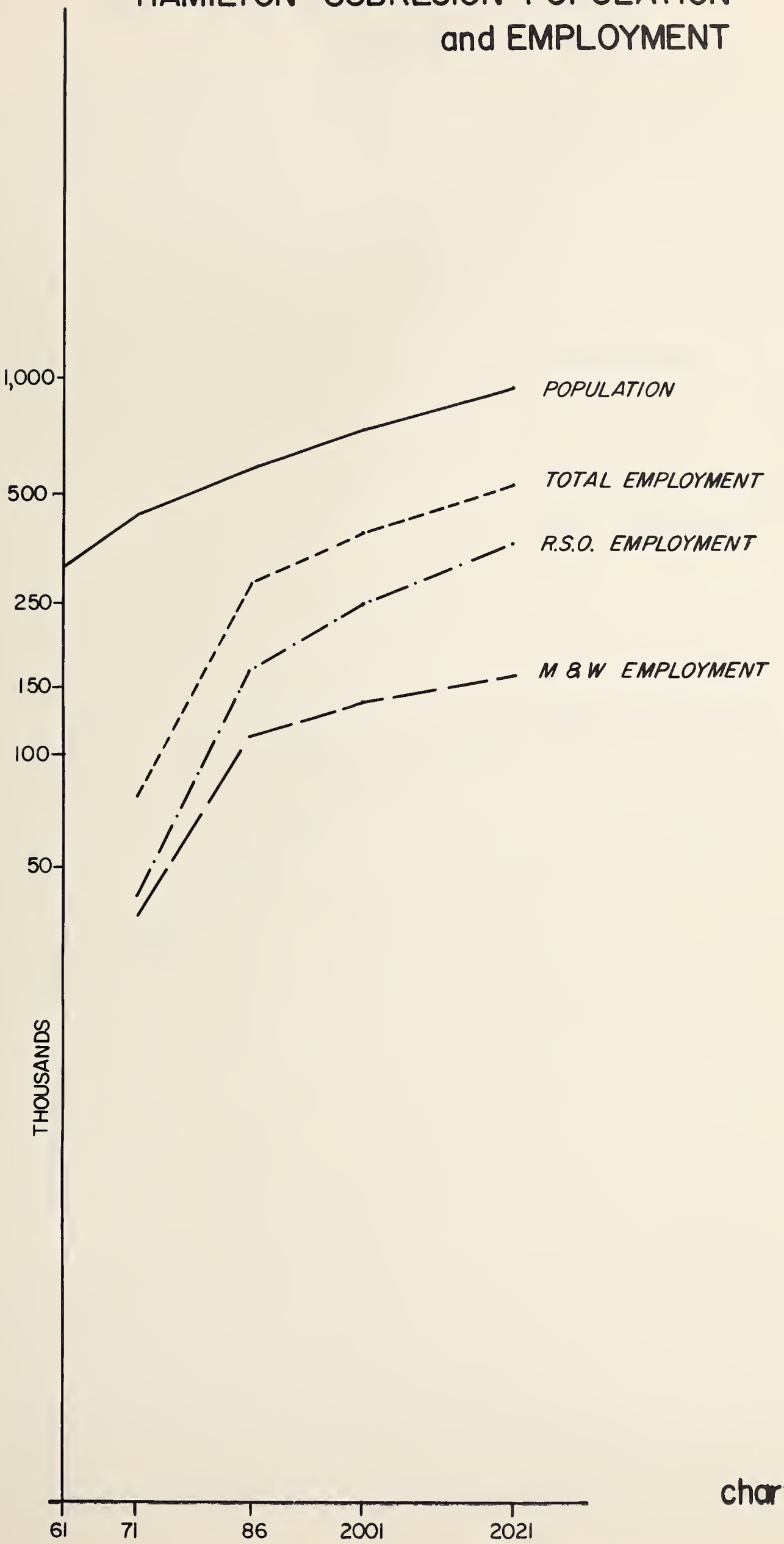

chart 6

OSHAWA SUBREGION POPULATION and EMPLOYMENT

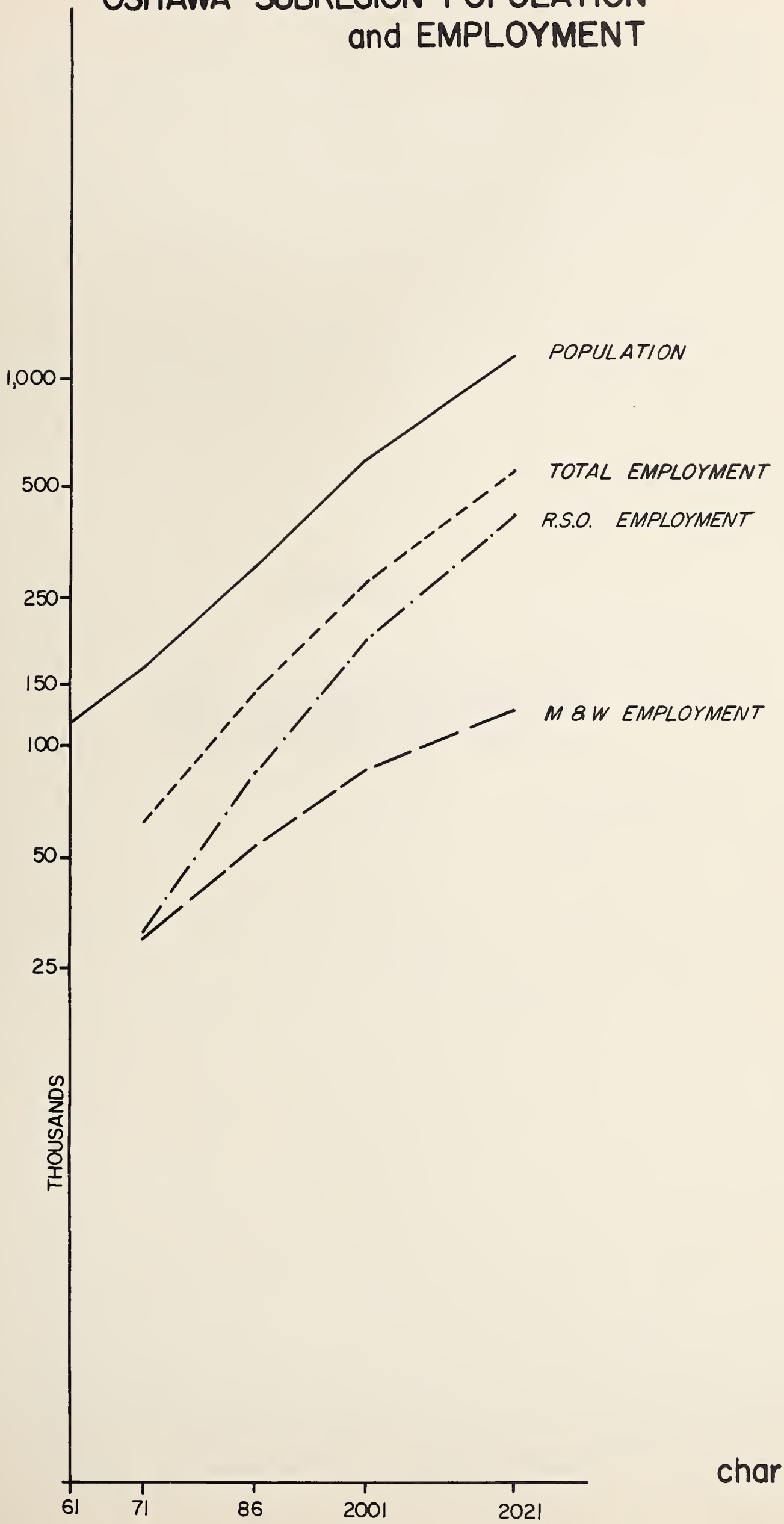

chart 7

APPENDIX 2

ONTARIO: POPULATION PROJECTIONS BY REGIONS AND COUNTRIES FOR YEARS 1976, 1981, 1986, 1991, 1996, 2001

ONTARIO: POPULATION PROJECTIONS BY REGIONS AND COUNTIES FOR YEARS
1976, 1981, 1986, 1991, 1996, 2001

Assumptions: Medium Fertility; 50,000 net external migration per annum; internal migration at 0.27 per cent of Ontario populati

Region County	1971	1976	1981	1986	1991	1996	2001
Eastern Ontario	1,070,916	1,143,177	1,225,712	1,312,524	1,392,175	1,459,173	1,518,579
Dundas	17,457	17,252	17,092	17,034	16,928	16,654	16,201
Frontenac	101,692	105,415	109,526	113,485	116,557	118,408	119,446
Glengarry	18,480	18,551	18,889	19,407	19,803	19,934	19,952
Grenville	24,316	24,889	25,563	26,379	27,170	27,742	28,136
Hastings	99,393	104,437	110,655	117,618	123,894	128,769	132,738
Lanark	42,259	42,270	43,063	43,997	44,661	44,860	44,782
Leeds	50,093	50,438	51,052	51,807	52,280	52,206	51,765
Lennox & Addington	28,359	29,969	31,942	34,268	36,643	38,784	40,679
Ottawa-Carleton	471,931	528,391	588,269	648,942	706,418	759,174	809,310
Prescott	27,832	28,456	29,514	30,775	31,798	32,359	32,677
Prince Edward	20,640	19,943	19,543	19,272	18,804	18,035	17,130
Renfrew	90,875	93,368	97,392	102,400	106,861	109,883	111,966
Russell	16,287	17,232	18,397	19,829	21,251	22,462	23,534
Stormont	61,302	62,566	64,815	67,311	69,107	69,903	70,263
Central Ontario	4,644,927	5,095,350	5,576,444	6,072,166	6,551,127	6,994,599	7,414,035
Brant	96,767	103,343	110,821	118,812	126,454	133,278	139,726
Dufferin	21,200	23,308	25,897	28,829	31,820	34,686	37,492
Durham	47,494	50,508	54,167	58,392	62,519	66,055	69,137
Haldimand	32,673	35,033	37,789	40,879	43,959	46,773	49,406
Haliburton	9,081	9,666	10,371	11,152	11,902.	12,600	13,300
Halton	190,469	222,079	257,191	295,551	334,267	371,102	406,500
Muskoka	31,938	33,471	35,820	38,443	40,943	43,168	45,271
Niagara	347,328	367,681	391,524	417,303	441,380	461,588	479,176
Norfolk	54,099	56,434	59,336	62,550	65,542	68,051	70,256

Assumptions: Medium Fertility; 50,000 net external migration per annum; internal migration at 0.27 per cent of Ontario populati

Region County	1971	1976	1981	1986	1991	1996	2001
Central Ontario (Cont'd)							
Northumberland	48,162	50,170	53,134	56,532	59,816	62,586	64,966
Ontario	196,257	217,925	242,235	268,901	295,658	320,407	343,234
Peel	259,402	328,043	403,275	484,214	567,951	651,376	734,241
Peterborough	87,804	92,256	97,403	102,875	107,772	111,604	114,761
Simcoe	171,433	185,315	201,929	220,007	237,601	253,517	268,262
Victoria	34,242	35,526	37,524	40,034	42,542	44,724	46,771
Waterloo	254,037	290,062	327,629	366,369	405,166	443,170	480,753
Wellington	108,581	121,001	135,528	151,263	166,957	181,968	196,758
Wentworth	401,883	418,864	437,451	455,543	470,430	481,254	489,552
York	2,252,077	2,454,665	2,657,420	2,854,517	3,038,448	3,206,692	3,364,473
Southwestern Ontario	1,180,514	1,251,213	1,335,196	1,426,266	1,513,551	1,590,656	1,661,552
Bruce	47,385	49,297	52,003	55,538	59,204	62,450	65,496
Elgin	66,608	69,949	74,291	79,034	83,739	88,033	92,002
Essex	306,399	333,117	363,453	395,802	427,550	457,684	487,574
Grey	66,403	68,141	70,947	74,205	77,383	80,074	82,421
Huron	52,951	50,833	49,368	48,232	46,713	44,442	41,677
Kent	101,118	105,214	110,681	116,922	122,714	127,373	131,373
Lambton	114,314	119,491	125,740	132,562	138,635	143,217	146,653
Middlesex	282,014	307,020	334,166	361,827	388,364	412,604	435,086
Oxford	80,349	83,511	87,594	92,351	96,774	100,244	103,135
Perth	62,973	64,640	66,953	69,793	72,475	74,535	76,135

Assumptions: Medium Fertility; 50,000 net external migration per annum; internal migration at 0.27 per cent of Ontario population

Region County	1971	1976	1981	1986	1991	1996	2001
Northeastern Ontario	582,379	617,424	660,497	708,317	752,779	789,336	821,053
Algoma	121,937	130,349	140,709	152,159	162,991	172,216	180,465
Cochrane	95,836	95,660	96,267	97,190	97,218	95,720	93,177
Manitoulin	10,931	10,960	11,244	11,650	12,032	12,293	12,467
Nippissing	78,867	82,636	87,485	93,085	98,213	102,064	105,016
Parry Sound	30,244	31,383	33,260	35,529	37,773	39,755	41,664
Sudbury	198,079	220,156	245,410	272,545	298,843	322,817	345,500
Timiskaming	46,485	46,280	46,122	46,159	45,709	44,471	42,764
Northwestern Ontario	224,370	225,997	229,457	233,263	235,122	234,023	230,921
Kenora	53,230	52,891	52,781	52,773	52,421	51,341	49,589
Rainy River	25,750	24,453	23,363	22,251	20,811	18,983	16,910
Thunder Bay	145,390	148,653	153,313	158,239	161,890	163,699	164,422
Total Ontario	7,703,106	8,333,161	9,027,306	9,752,536	10,444,754	11,067,787	11,646,140

Ministry of Treasury, Economics
and Intergovernmental Affairs
Office of Economic Policy
Economic Analysis Branch

March 7, 1974

APPENDIX 3

TERMS OF REFERENCE

Ontario

Ministry of Treasury
Economics and
Intergovernmental
Affairs

Queen's Park
Toronto Ontario

April 10, 1974

Mr. H.L. Robinson
M.V. Jones & Associates
209 Adelaide Street East
Toronto, Ontario
M5A 1M8

Dear Mr. Robinson:

COLUC TASK FORCE

We wish the firms of M.V. Jones & Associates and Peat Marwick & Partners to provide the following services in connection with the COLUC work program:

1. Using distributions of populations and employment (the latter in two categories) provided by the COLUC support staff for

   (a) the year 1971, and

   (b) a mature state beyond year 2000,

   to prepare a documented set of urban place scenarios describing the most straightforward logical route from the one condition to the other.

2. Indicate weaknesses or inconsistencies in the data base, and propose ways of overcoming these, if feasible.

We stress that the result is intended to be used as a preference standard for subsequent COLUC deliberations, not to be a COLUC output; it may therefore be as "pure" as needed to express the adopted phasing logic, even simplistic. It should recognize trends, but not be bound by them (few commitments are absolute, in the COLUC context). By the same token, it is vitally important that the results embody indications of the sensitivity of each number or date to the method,

. . /

assumptions and the COLUC philosophy. In this way, it is hoped that adjustments to the scenarios can be effected with full knowledge of the consequences. The need for this facility should directly influence the format and display of findings.

In the first cycle, we would not expect you to improve the data base, but to apply most thought and effort to the development, recording and application of your allocation rationale.

We would expect frequent verbal reports, and for this purpose your contact will be Mr. A.R. Schmidt. Up to two half-day presentations to the Task Force should be included in your budget.

We require three copies of a draft report by April 16, 1974, and 60 copies of a final report one week after we have commented on the draft.

The cost of this work, including the fees and expenses of professionals of both M.V. Jones and Associates and Peat Marwick and Partners shall not exceed $10,000.

If you are in agreement with the terms set out in this letter, please sign and return the enclosed copy of this letter.

Yours truly,

C. Peter Honey
Assistant Deputy Minister
Urban and Regional Affairs

Agreed . . . . . .
(Signature)

Date . . . . . .

cc: Messrs. N.H. Richardson
R.A. McNally
R.D. Burns
A.R. Schmidt

APPENDIX 4

LETTER TO MR. A.R. SCHMIDT, APRIL 23, 1974
RE ACCELERATION OF POPULATION GROWTH IN
OSHAWA SUB-REGION

mvj murray v. jones and associates limited
urban and regional consultants
209, adelaide street east, toronto, ontario M5A 1M8 (416) 366-9561
814, mcleod building, edmonton, alberta T5J 0P1 (403) 424-3001

Toronto, Ontario
April 23, 1974

Mr. A. R. Schmidt
COLUC Task Force
Ministry of Treasury, Economics
and Intergovernmental Affairs
801 Bay Street
Toronto, Ontario

Dear Mr. Schmidt:

As agreed with you last Friday, we have reviewed Table 7 of our draft report to see whether it would be possible, consistent with the balance of the COLUC area system as a whole, to allocate a larger population in 1986 to the Oshawa sub-region and thus give greater expression to the preference for a more rapid growth in this sub-region between 1971 and 1986. The results of this review are shown in the table attached.

Before commenting on this table in detail, it may be useful to state the general framework and constraints of the problem. Two fundamental objectives of the Mature-State Plan are: (i) to accelerate growth to the east of Metro Toronto in comparison with the rest of the COLUC area and thus alter the population balance as between the east, the west and the centre, and (ii) to decentralize employment and thereby establish a hierarchy of urban places rather than have a series of dormitory satellites predominantly oriented towards Metro Toronto. These two objectives are related in that the Mature-State plan would not be achieved merely by shifting population growth from Mississauga and perhaps Hamilton while employment remained concentrated in Metro Toronto.

The constraint is that the rate of population growth in the COLUC area is estimated to be significantly lower in 1971-86 than it was in the preceding ten years and indeed in the preceding five. The acceleration of population growth in one sub-region thus involves a more than proportionate reduction in growth elsewhere, and this cannot be done wholly in terms of preferences and without some regard to past trends.

My conclusion is that some acceleration of growth in the Oshawa sub-region compared to what we showed in our draft report may be both possible, as well as desirable. There is however a limit to this except at the cost of other preferences for the COLUC system as a whole. This limit appears to be at a 1986 population of approximately 350,000 for the Oshawa sub-region. The growth of the eastern sub-region would thereby be accelerated by about 30%, whereas the growth rate to the west of Metro Toronto would be lowered by about 40%. The balance in comparison with past trends would be drastically altered.

Turning now to the details of the table attached:

In Alternative A, the 1986 population of the Oshawa sub-region is increased by 20,000 to 330,000 and 10,000 is subtracted from the populations of the Mississauga and Hamilton sub-regions. The result is to raise the growth rate in the Oshawa sub-region from 4.2% per year as in our Table 7 to 4.6% per year, and at the same time to lower the growth rate in the Mississauga sub-region from 4.8% to 4.7% per year, and the growth rate in the Hamilton sub-region from 2% to 1.9% per year.

The changes in 1986 require changes in 2001 as well. In order to maintain the same growth rate from 1986 to 2001 as in the previous period, the 2001 population of the Oshawa sub-region has been increased by 60,000 to 750,000; 40,000 has therefore been subtracted from the population of the Mississauga sub-region and 20,000 from that of the Hamilton sub-region. The growth rate of the Oshawa sub-region between 1986 and 2001 is thus maintained at 4.6% per year. The growth rate of the Mississauga sub-region is lowered from 3.2% to 3.0%, and that of the Hamilton sub-region from 1.5% to 1.4% per year.

The further consequence of these changes is to alter slightly the growth rates between 2001 and the Mature-State. The growth rate of the Oshawa sub-region in this period is lowered from 3.4% to 2.8% per year, while the growth rate of the Mississauga sub-region is raised from 1.8% to 2.0% per year, and that of the Hamilton sub-region from 1.2% to 1.3% per year.

All of the foregoing changes are carried further in Alternative B in which 40,000 is added to the 1986 population of the Oshawa sub-region, and 20,000 is deducted from the populations of the Mississauga and Hamilton sub-regions. The result is that the growth rate of the Oshawa sub-region to 1986 is raised to 5.0%, while the growth rate of the Mississauga sub-region is lowered to 4.6%, and that of the Hamilton sub-region is lowered to 1.8%.

However, the necessary adjustments to the population allocations in 2001 introduce a complication. In order to maintain the growth of the Oshawa sub-region from 1986 to 2001 at 5.0%, its population in 2001 is increased to 730,000. This has three inter-related consequences:

(i) the growth rate of the Oshawa sub-region from 2001 to the Mature-State is reduced to 2.2%;

(ii) the growth rates in 1986 to 2001 of the Mississauga sub-region is lowered to 2.7%, and

(iii) the growth rates of the Mississauga and Hamilton sub-regions from 2001 to the Mature-State are raised to 2.2% and 1.5% respectively.

These growth rates are perhaps not impossible, but they seem to me less realistic and well balanced than those of Alternative A.

In any case, and wholly apart from the question of increasing employment so that the sub-region does not become an eastern dormitory area for Metro Toronto, Alternative B represents about as far as one can go in accelerating growth of the Oshawa sub-region from 1971 to 1986, unless one is prepared to accept one or other of the following consequences:

(a) reduction in the growth of the Mississauga and Hamilton sub-regions from 1971 to 1986 would become extreme and beyond the limits of realism;

(b) the population control totals for the COLUC area would be exceeded. Whether this is likely to happen or not, and what the probable consequences of its happening might be, are outside our terms of reference. Nevertheless, the control totals are not immutable and Hans Blumenfeld has expressed the opinion, with which we concur, that the actual population is more likely to fall below than it is to exceed them;

(c) the growth rate of the Oshawa sub-region from 1986 to 2001 would be lower than from 1971 to 1986;

(d) the growth rate of the Hamilton sub-region and eventually also that of the Mississauga sub-region from 2001 to the Mature-State would be higher than is possible, within the given control totals, from 1986 to 2001;

(e) the population allocated to Metro Toronto is reduced in favour of the Oshawa sub-region. This possibility is illustrated in Alternative C of the table attached.

The first two of these consequences need no further comment. As to the third and fourth, given the overall objective of accelerating growth over the long haul to the east of Metro Toronto, there would seem little merit in doing so up to 1986 to such an extent that it would have to be slowed down again between 1986 and 2001. By the same token, it does not seem appropriate to envisage heroic measures to slow down growth to the west of Metro Toronto up to 1986, and then relax the constraint somewhat to the turn of the century and even more so from the turn of the century to the Mature-State.

Alternative C removes these difficulties. It leaves the population of the Oshawa sub-region in 1986 and 2001 as in Alternative B and the 1986 population of the Mississauga and Hamilton sub-regions as in Alternative A, and it subtracts 20,000 from the 1986 population of Metro Toronto to keep within the control total. The growth rate of Metro Toronto from 1971 to 1986 is thus lowered from 1.1% to 1.0% per year. In 2001, the population of Metro Toronto is reduced by 40,000, while the populations of the Mississauga and Hamilton sub-regions fall between the allocations in Alternative A and B. The growth rates are reasonably balanced and the allocations show the desired shift of growth from Metro Toronto and the West to the East. All three alternative allocations thus give reasonably acceptable results insofar as population alone is concerned. The critical issue is the required growth of employment and whether the process of accelerating employment in the Oshawa sub-region over the next ten years be considered equally feasible as decentralization from Metro Toronto to the West. Until the practicable means of accelerating employment in the Oshawa sub-region have been more fully investigated, one should, I think, be cautious about an unduly "preferential" population allocation to the Oshawa sub-region by 1986. 350,000 would seem to me to be an appropriate maximum from this point of view.

* * *

My attention has been drawn to Table 2 of the paper entitled "Task #7 - Population Allocations to Urban Places 1986 and 2001". In order to test the validity of the allocation in this table, I have prepared Table 7A attached, which is in the same form as Table 7 of our report but uses the figures of the table referred to. Table 7A gives rise to the following comments:

1. None of the population totals for the 23 urban places agree with the control totals which we were given by the Task Force working group. The 1971 total differs by 10,000 and in some of the sub-regions by substantially more than that. The Mature-State total is 55,000 less, there being a difference of 45,000 in the Mature-State population of the Mississauga sub-region

and 5,000 less in the Mature-State populations of the Hamilton and Oshawa sub-regions. The 1986 total is lower than the control total which we were given, while the 2001 total is greater. It follows that the constraints on the sub-regional and urban place allocations were not the same in this Table 2 as those under which we were working.

2. Aside from the more rapid increase in the Oshawa sub-region than we had allowed for, to which reference is made below, the main difference in the 1986 allocations is the larger population for Metro Toronto, resulting in a smaller population for the other sub-regions. The result is that Metro Toronto is allocated a much greater share of the total COLUC growth from 1971 to 1986, namely, 49% according to these figures compared to 36% in our allocation, together with a reduction in the share of growth allocated to the Mississauga and Hamilton sub-regions, from 45% in our allocation to 22% here. The further result is that the growth rate for the Mississauga sub-region is cut to 2.6% per year, that is, by almost two-thirds compared to the rate in 1961-71, and a similar reduction is imposed on the growth rate of the Hamilton sub-region, so that this sub-region's growth rate is less than that of Metro Toronto. Both of these reductions seem quite unrealistic, and in the case of the Hamilton sub-region it is difficult to conjecture what planning goal or desirable public policy would thereby be served.

3. The growth rate of the Oshawa sub-region is accelerated from 3.9% in 1961-71 to 5.9% in 1971-86; the sub-region's share of the total COLUC growth is increased from 14% in our allocation to 23% here. Apart from the question whether such an acceleration is realistic, its consequence is a substantially reduced growth rate between 1986 and 2001 and a further even greater reduction between 2001 and the Mature-State. As indicated above, it does not seem desirable to aim at a hot-house growth rate in one period if it must be followed by a sharply reduced rate in the following period.

4. The consequence of these changes in growth rate in the Oshawa sub-region are changes of the opposite kind in the Mississauga and Hamilton sub-regions. If it were indeed possible to reduce the growth rates of these two sub-regions between 1971 and 1986 to the rates shown, the allocations then involve an acceleration of these rates between 1986 and 2001 to be followed by a deceleration after 2001. Specifically, the growth of the cities of Hamilton and Mississauga are curbed in 1971-86 and then accelerated in 1986-2001. In the Aurora-Newmarket region, a higher growth rate after 2001 than between 1986 and 2001 is also implied. These "stop-go" assumptions seem to me unrealistic, they are not desirable, nor are they necessary to achieve the Mature-State.

To sum up, an examination of the Table 2 referred to suggests that the allocations were made without an analysis of their implications for the COLUC area as a system in which the various parts must fit together and be integrated in a logically consistent as well as desirable pattern. A system of inter-related variables does not allow values to be assigned to one of the variables without a corresponding effect on the values of the others. The system must therefore be analyzed to reveal its structure and the inter-relationships between its variables, before assigning values, however desirable at first glance these values may seem to be, independently of the resulting values for the other variables. This would not appear to have been done with the allocations in question, so that the "purity" of some of the preferences is gained at the cost of "impurities" and non-preferences elsewhere as well as at the cost of a consistent phasing logic for the system as a whole.

I trust that the above comments will be helpful in evaluating the results of the review of our Table 7 which you asked us to undertake, in particular the point that a 1986 population for the Oshawa sub-region of about 350,000 constitutes more or less the limit to which one can go in accelerating the growth of the Oshawa sub-region and still maintain internal balance and consistency in the system as a whole, not only up to 1986 but over the whole time span between the present and the Mature-State.

Yours sincerely,

H. L. Robinson.

HLR:sp

Alternative Populations
Eastern and Western Sub-Regions
1986 and 2001

	1961	1971	1986	2001	Mature State
Alternative A					
Mississauga Sub-Region	149.9	310.2	615	960	1,415
		2.069	1.98	1.56	1.47
		7.5%	4.7%	3.0%	2.0%
Hamilton Sub-Region	320.3	441.8	585	725	945
		1.379	1.32	1.24	1.303
		3.3%	1.9%	1.4%	1.3%
Oshawa Sub-Region	114.3	167.3	330	650	1,140
		1.464	1.97	1.97	1.75
		3.9%	4.6%	4.6%	2.8%
Alternative B					
Mississauga Sub-Region		310.2	605	905	1,415
			1.95	1.50	1.56
			4.6%	2.7%	2.3%
Hamilton Sub-Region		441.8	575	700	945
			1.30	1.22	1.35
			1.8%	1.4%	1.5%
Oshawa Sub-Region		167.3	350	730	1,140
			2.09	2.09	1.56
			5.0%	5.0%	2.2%
Alternative C - including Metro Toronto					
Metro Toronto		2,104	2,460	2,700	2,900
			1.17	1.10	1.074
			1.0%	0.6%	0.4%
Mississauga Sub-Region		310.2	615	930	1,415
			1.98	1.51	1.55
			4.7%	2.8%	2.2%
Hamilton Sub-Region		441.8	585	715	945
			1.32	1.22	1.32
			1.9%	1.4%	1.4%
Oshawa Sub-Region		167.3	350	730	1,140
			2.09	2.09	1.56
			5.0%	5.0%	2.2%

TABLE 7A

COLUC POPULATION ESTIMATES
ONTARIO, COLUC URBAN AND
URBAN SUB-REGIONS
Based on Table 2 - Task #7, COLUC Working Group
(in 000's)

	1961	1971	1986	2001	Mature State	Mature State/ 1971
Ontario						
Total Pop.	6,236	7,703	9,753	11,646	14,600	
Growth		1.235	1.266	1.194	1.254	1.90
Annual Rate		2.1%	1.6%	1.2%	1.14%	
COLUC Urban						
		(3,082)*				
Total Pop.	2,310.7	3,092	4,058	5,293	6,645	
Growth		1.338	1.312	1.304	1.255	2.15
Annual Rate		3.0%	1.8%	1.8%	1.2%	
Metro Toronto						
		(2,118)*				
Total Pop.	1,681.0	2,104	2,577	2,815	2,900	
Growth		1.252	1.22	1.09	1.03	1.38
Annual Rate		2.3%	1.3%	0.6%	0.2%	
Aurora/Newmarket Sub-Region						
		(80)*				
Total Pop.	45.2	69.0	124	168	300	
Growth		1.527	1.80	1.36	1.79	4.35
Annual Rate		4.3%	4.0%	2.0%	2.9%	
Mississauga Sub-Region						
		(289)*				
Total Pop.	149.9	310	456	816	1,370	
Growth		2.069	1.47	1.79	1.68	4.42
Annual Rate		7.5%	2.6%	4.0%	2.6%	
Hamilton Sub-Region						
		(423)*				
Total Pop.	320.3	442	510	756	940	
Growth		1.379	1.15	1.48	1.24	2.13
Annual Rate		3.3%	1.1%	2.6%	1.1%	
Oshawa Sub-Region						
		(172)*				
Total Pop.	114.3	167	391	738	1,140	
Growth		1.464	2.34	1.89	1.29	6.81
Annual Rate		3.9%	5.9%	4.3%	1.3%	

* 1971 figures from Table 2.

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